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PRACTICAL PHOTOGRAPHY:

ON

Glass and Paper:

A MANUAL,

CONTAINING SIMPLE DIRECTIONS FOR THE PRODUCTION OF

PORTRAITS, VIEWS, &c.

BY THE AGENCY OF LIGHT.

FIFTH EDITION.

LONDON:
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PHOTOGRAPHIC INSTRUMENT MAKERS, AND OPERATIVE CHEMISTS,
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By Appointment to the Queen.

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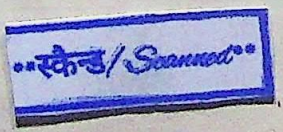

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PREFACE.

THE first edition of "Practical Photography" was published about eight years ago, and since that period four large editions, comprising not less than twenty thousand copies, have been issued. The steady but decided progress which the Art of Photography has made during late years has rendered desirable some more specific revision than the mere modification of old formulas or the addition of new ones. The present edition of this work has, therefore, been entirely re-written, so as to render the whole of the instructions in the most perfect accordance with the most enlightened theory and successful practice of the Art.

The increased scope and capabilities of Photography, and the growing interest which attaches to many of its applications have rendered desirable a considerable extension of this work beyond its original limits. In order to preserve intact,

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however, its character as a book for beginners, it has been deemed wise to divide it into two parts. The first part contains the fullest, and, at the same time, the most simple instructions, for practising the wet collodion process, positive and negative, and for printing positives, so as to enable the beginner to become perfectly familiar with the principles of the Art, and the most essential and simple part of its practice, before his attention is distracted by its other ramifications. With a view to meet a want which has long existed, a chapter on the Practice of Photography in a Tropical Climate is appended to the present edition.

The second part is devoted to those processes which are interesting to the advanced student: and it is hoped that nothing has been omitted in the two parts, which could conduce to make this work an instructive teacher, and constant companion, for reference, both to the amateur and professional Photographer.

153, *Fleet Street, January*, 1863.

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INTRODUCTION.

In a work devoted to Practical Photography it will be obviously unnecessary to devote much space to the exposition of theories. It will be the object of the writer in the following pages to explain just so much of principles as may lead to intelligent and successful practice, avoiding carefully everything calculated to perplex or bewilder the neophyte photographer.

The term Photography, is derived from two Greek words, and means writing or drawing by light. It includes all methods whatever in which objects are delineated by the agency of light. There are several distinct processes in photography whereby pictures can be produced, but these pages will be confined to an explanation of those processes on *glass* and *paper* which are of universal application, and produce the best results by the simplest means.

It is unnecessary in this work to enter at length into the history of Photography. But it may be interesting to state briefly that whilst some of the principles upon which the art is based were long known to scientific men, it was not until the year 1839 that they were successfully applied, at which time two distinct discoveries were made. In France, M. Daguerre discovered the Daguerreotype process, by which photographs were produced on silver plates; a process now but little practised: and in this country, Mr. Fox Talbot discovered the calotype or Talbotype, by which photographs are produced on paper. Various modifications of this process were made; and in the year 1851 Mr. Scott Archer discovered the collodion process, a method which revolutionized the art, and is now most commonly practised.

All the processes we are about to describe depend upon the chemical action of light upon certain salts of silver. The precise nature of that action is not well understood, but it always tends,

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with or without the aid of a "developer,"* to reduce the salts of silver to the metallic state, the image or picture consisting of such reduced silver.

The apparatus and chemicals necessary, and the use of each will be duly described; but there are a few fundamental principles and technical terms, which it is desirable the reader should understand at the outset of his studies, and which we shall explain at once.

The light of the sun, as is well known, consists of rays of three distinct colours, yellow, red, and blue. These unite to form white light; when separate, however, each colour has distinct properties; the yellow ray is the chief source of illumination, or light as it is popularly understood; the red ray is the source of heat; and the blue ray is the source of chemical action. This chemical action is most important in all the operations of nature; but it is of its influence in photography we have now to speak. It is upon this chemical power of the blue ray, and which is called *actinism*, that the art of photography is based. The yellow and red rays are without this chemical action, an important fact which the reader must bear in mind, as advantage is taken of the circumstance to enable the photographer to perform many operations with sufficient light to work with comfort, which must otherwise have been performed in absolute darkness, the sense of touch alone guiding the manipulations. The student will remember, then, that it is actinism, a chemical power which accompanies, or forms part of the sun's light, by which his pictures are produced.

Various kinds of pictures are produced by the aid of photography; but they are divided into two distinct classes, which are known as *Negatives* and *Positives*.

The term negative is used to designate an image which is reversed as regards light and shadow; for instance, in a portrait the face would be dark and the black coat light, and so in the various gradations of light and shadow. It must be understood, however, that this reversal in the relations of light and shadow, only need exist when the image is examined by *transmitted* light, that is, when it is looked through; those parts which should constitute the lights of the picture are then found to be opaque, obstructing the light,

* Development is a process in photography to be explained in due course.

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and therefore dark; whilst the parts forming the shadows and darks in the picture are transparent, and appear light. It is this quality in the negative which makes it of value, rendering it capable of producing an ultimate number of pictures, in which light and shadow are in their proper relations, by sun-printing. As this will be better understood if we remark that the negative may, in a certain sense, be regarded as the plate or pattern used in poonah painting or stencilling, the light in printing acting through the transparent parts only of the negative, in some sense, as the colour of the stenciller passes only through the transparent parts of the pattern.

The term *positive* is simply used in contradistinction to negative, and implies a picture in which the proper relations of light and shadow exist. The term *direct positive*, which is sometimes used, is employed to describe a positive taken at one operation in the camera. Whilst negatives are always examined by transmitted light, positives are generally to be seen by reflected light, except in the case of transparencies, which are sometimes called *transmitted positives*.

Photographs are produced on a variety of substances, but chiefly on *glass* and *paper;* and by a variety of methods, each of which is generally distinguished a *process*. These may be chiefly divided into the *collodion process* and *paper processes*, and each of these may again be divided into *wet* and *dry* processes. The *wet collodion process* is at once the most simple, the most useful, and the most extensively practised. By its aid direct positives, on glass and other substances, known as *collodion positives*, as well as negatives, can be produced. It also gives the greatest delicacy, and is the most rapid process known. Collodion is also used for various dry processes. The paper processes include the *Calotype* or *Talbotype process* and the *waxed paper process*. Both these are dry processes, and are chiefly used for landscape photography, as they are more convenient, and involve the carriage of less apparatus than the collodion process, for field use.

With these few preliminary explanations, which will enable the reader to have a more intelligent understanding of what follows, we will proceed to the details of actual practice.

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The Collodion Process.

POSITIVES ON GLASS.

This is the simplest photographic process, and will first claim the attention of the beginner. We shall presume that at the outset the student will purchase his collodion, &c., ready for use; and afterwards, when he has acquired some skill, he may attempt to make it for himself. Distinct chapters will be found on the preparation of collodion, and on the choice of apparatus. At present we will assume that a proper equipment has been secured. We shall simply mention of what this equipment consists, referring the reader for description, and hints on selection, to the chapter devoted to that subject. For positives the student will require:—

A Camera and Lens.
A Camera Stand.
A Dipping Bath for the Nitrate of Silver Solution.
A Dipper for ditto.
A Head Rest, to steady the Sitter.
Glass Plates of various sizes.
A Holder for cleaning ditto.
Set of Scales and Weights.
Two or three Glass Measures.
A Developing Stand.
Three or four Porcelain Dishes.
One Gutta-Percha ditto.
A couple of Glass Funnels.
Focussing Cloth of black Cloth or Velvet.
A stock of Positive iodized Collodion.
Pure re-crystallized Nitrate of Silver.
Protosulphate of Iron.
Acetic Acid.
Cyanide of Potassium.

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Spirits of Wine.
Crystal Varnish.
Black Varnish.
Filtering Paper.
Plate Boxes.
A Box of powder Colours and Pencils, &c.
Cases, Frames, &c.

Having secured the necessary apparatus and chemicals, it is necessary to prepare a place for operations. For portraiture a glass house constructed for the purpose is generally required; but the amateur may place his sitters in a well-lighted room or in a garden, or he may commence practice upon such views as are readily within his reach. It will be necessary, however, to arrange a dark room, in which all operations with the sensitive plate must be conducted.

The Dark Room.

In the dark room it is necessary to exclude all white, or actinic, light; but plenty of yellow, or non-actinic, light may be admitted. Especial care should be taken to prevent white light entering under doors, or through crevices, &c. It has been already briefly explained that yellow light is without chemical action on the sensitive surfaces used in photography, and that abundance of light, of a non-actinic character, to permit working in comfort, may be admitted into what is technically called the "dark room."

It is better to have only one window, near which may be placed the operating table. The window should be glazed with yellow or orange glass, which has been carefully tested to ascertain that it excludes actinic light. The glass which is coloured with oxide of silver answers best. If it be not convenient to have yellow glass, the light from the window must be modified by placing before it a triple thickness of yellow or orange calico; the light which enters through this screen will not, if it be of the right colour, affect the sensitive surfaces, but will enable the operator to conduct the process with ease and comfort. Should a window not be at

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command, the light of a lamp, surrounded with ruby or yellow glass, can be used with advantage (Figs. 1 and 2).

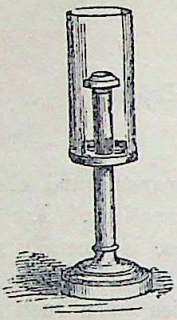

Fig. 1.

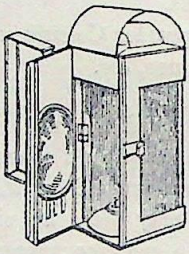

Fig. 2.

It will be found convenient to have a broad shelf fitted up to hold three or four washing pans. A small shelf near the table will also be a convenience as a resting place for the bottles containing the chemicals; this enables the table to be quite clear and fit for action, which will be found a great advantage, and will tend much to the success of the various processes.

It is desirable, if possible, that the dark room should have a sink and an unlimited supply of water. If this cannot be had, a pan of clean water, with tap, as likewise vessels for the refuse waters and liquids used in the production of pictures must be provided.

The cloths and leathers used in the collodion process ought to be hung on separate hooks, in this room, so as to be kept quite distinct and within reach, and each one should be returned to its place when done with.

The dark room should have a fireplace or stove, so as to preserve all the solutions from a very low temperature in winter. A fire also facilitates the rapid drying of paper and dry plates after exciting. It is desirable, where it can be conveniently managed, to have the dark room divided into two distinct parts, which can be shut off from each other; this gives facilities for preparing dry plates and for other operations which will readily be discovered in practice.

The dark room should be kept free from dust, and should never be suffered to become the receptacle for all kinds of lumber and

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waste rubbish. Cleanliness and order are imperative in every branch of photography.

Weights and Measures.

It may be useful here to explain that all photographic formulæ are prepared by apothecaries weight, in which an ounce consists of 480 grains or 8 drachms, each containing 60 grains. Many of the articles are sold commercially by avoirdupois weight, in which an ounce only contains 437½ grains. If an ounce of nitrate of silver, just as bought, were made up into a bath according to the preceding formula, it would necessarily be *too* weak. This fact must be borne in mind. A set of scales and weights suitable for the purpose must be procured. Those with glass pans, which can be readily cleaned should be preferred (fig. 3).

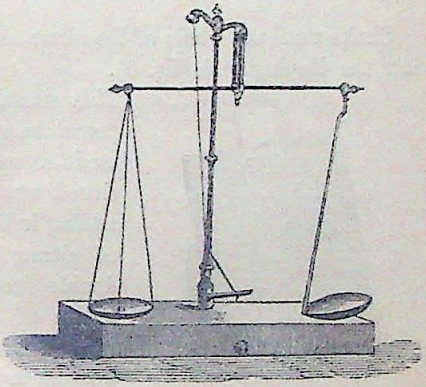

Fig. 3.

Solutions are estimated by fluid measure: a minim, which is sometimes roughly estimated as a drop, being the 60th part of a drachm. It is better to use a minim measure (fig. 4) than to attempt to use drops, as the latter is a very uncertain quantity. An ounce contains 8 drachms, (fig. 5) and a pint 20 ounces. These will be measured in graduated glasses for the purpose.

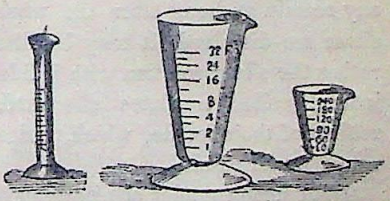

Fig. 4.

Fig. 5.

The Nitrate of Silver Bath for Positives.

Having secured a suitably fitted dark room, it is necessary next

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to prepare the various solutions required for use. Of these the first and most important is the nitrate of silver bath. It consists of

Pure recrystallized nitrate of silver ...	1 ounce
Distilled water	12 „
Nitric acid	6 minims
Iodide of potassium	2 grains

Shake until the whole of the silver is dissolved, and then filter into the dipping bath (fig. 6).

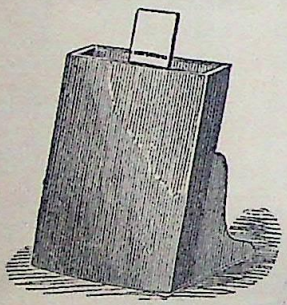

Fig. 6.

This vessel may be of either glass, porcelain, or gutta percha, but should be made scrupulously clean before use, and rinsed out with distilled water. On adding iodide of potassium to a solution of nitrate of silver, a process called double decomposition takes place, and iodide of silver is formed. This is insoluble in water and is at first seen floating in the solution in yellow curdy flakes; but being soluble to a certain extent in a solution of nitrate of silver, these curdy flakes become gradually dissolved, until the silver solution is saturated; and should any remain an hour after the whole of the crystals of nitrate of silver are dissolved, it may be filtered out. The object of saturating the silver solution with iodide at the outset, is to prevent the iodized collodion plates afterwards to be immersed from being robbed of their iodide, which, unless the solution were first saturated, would result.

With some samples of nitrate of silver, less nitric acid than the quantity above named will be necessary, and with some more. This will be best ascertained by a trial. If the resulting pictures when properly exposed and developed are wanting in detail in the shadows, too much nitric acid is present; but if the picture is deficient in brilliancy and vigour, and have a deposit on the deepest shadows, one or two drops more of nitric acid may be added. Some other circumstances will affect the results, with which the

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learner will become familiar as he proceeds through these pages, and continues to practise and gain experience.

Developing Solutions for Positives.

The solutions for developing positives must next be prepared. Either of the following solutions may be used:—

Protosulphate of iron	... 15 grains
Alcohol	... 20 minims
Glacial acetic acid	... 15 „
Water	... 1 ounce

Or,

Protosulphate of iron	... 20 grains
Acetic acid (glacial)	... 20 minims
Nitric acid	... 2 „
Alcohol	... 20 „
Water	... 1 ounce

Or,

Nitrate of baryta (powdered) ...	... 1 „
Nitric acid (s.g. 1·400)	... 3 drachms
Water	... 16 ounces

Mix and dissolve. Then add—

Protosulphate of iron (powdered)	... 1½ ounces.

A white turbidity will ensue, which will settle in a few hours. Decant or filter, and add about an ounce of alcohol, and the solution is ready for use. It should be kept carefully corked, as it rapidly loses developing power on exposure to the atmosphere. This is a solution of proto-nitrate of iron, with a little protosulphate in excess. When fresh it is of a green tint, but becomes yellow as the iron oxidizes, and is then gradually losing strength. A little fresh protosulphate should then be added. This developer gives very brilliant and silvery tones.

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In each case it is the salt of iron which acts as a developer, the acid being intended to restrain its too rapid action, which would injure the picture; and the alcohol simply aiding the solution in flowing evenly over the plate.

Fixing Solutions for Positives.

The fixing solution for positives is very simple and composed as follows:—

Cyanide of potassium	6 grains
Distilled water	1 ounce.

Selecting and Cleaning Glasses.

Having prepared these solutions, the next step will be cleaning the glass plate on which to take the picture. A number of these should be cleaned at once and kept in plate boxes (fig. 7) ready for use.

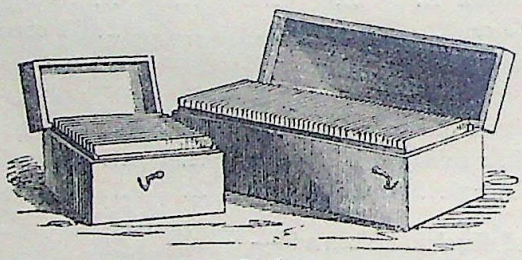

Fig. 7.

The best glass for the purpose is patent plate; but carefully selected flatted crown or polished sheet may be used: it will be necessary with the latter to select the polished side. The plates should be free from scratches, blisters, or other imperfections, as these would interfere with the beauty of the picture. The plates can be procured of the proper sizes to fit the camera. It may be desirable here to explain that photographs are generally taken on plates of certain specific sizes known by technical names, to which sizes all manufacturers of apparatus conform. These sizes are as follows:—

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Ninth size (1/9)	...	...	...	$2\frac{1}{2}$ by 2 inches
Sixth „ (1/6)	...	...	...	$3\frac{1}{4}$ by $2\frac{3}{4}$ „
Quarter „ (1/4)	...	...	...	$4\frac{1}{4}$ by $3\frac{1}{4}$ „
Third „ (1/3)	...	...	...	5 by 4 „
Half plate (1/2)	...	...	...	$6\frac{1}{2}$ by $4\frac{3}{4}$ „
Whole „ (1/1)	...	...	...	$8\frac{1}{2}$ by $6\frac{1}{2}$ „
Stereo	...	...	...	$6\frac{3}{4}$ by $3\frac{1}{4}$ „

Various extra sizes are also used.

To clean the glasses properly is a very important operation; and we may remark here that the beginner has probably to learn here a new term. It is not only necessary that the plates appear clean, but they must be *chemically clean*, that is, they must have no trace of anything which, in the subsequent delicate operations, could possibly set up chemical action. All the cloths used must be scrupulously clean, but they must not have been washed with soap. Linen cloths, of the kind known by housekeepers as glass cloths, are best, they should be first well washed in water containing soda, then boiled, and thoroughly rinsed in two or three changes of water.

Various methods of cleaning the glasses may be adopted; some persons simply preferring to wash them well in plenty of water and dried on the cloths named. But a simpler plan and quite as effective, consists in the use of a mixture of tripoli and spirits of wine (methylated spirit may be used), about the consistency of thick cream. The plate is placed upon the holder (fig. 8) and screwed firm. A little of the mixture is poured upon it, and rubbed with a circular motion all over the plate with a piece of woollen cloth. The other side is similarly treated. This done, the first side, which will be now dry, is again rubbed with a tuft of cotton wool, until all traces of the tripoli disappear. A few drops of alcohol are now rubbed upon the plate with another tuft of cotton wool. This is repeated on both sides; and the plate is then cleaned on the edges with a piece of linen cloth, and placed in the box. Old collodion may be used instead of the tripoli and alcohol, in the same manner.

Plates which have been used require still more carefully treating.

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If the collodion have been suffered to dry on it, the plates may be soaked in hot water until the film is easily removeable, or they may be cleaned with old collodion. When the film is removed, the plate

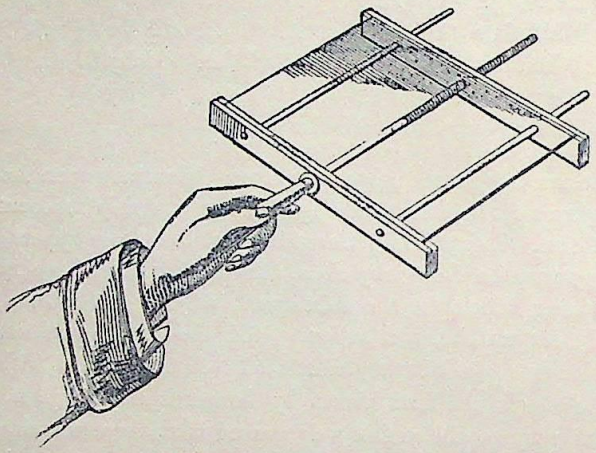

Fig. 8.

should be placed on the holder, and rubbed with the mixture of alcohol and tripoli, with a little nitric acid added, and then treated in the same way. Care should be taken to remove all particles of tripoli from the edges and corners before putting the plates away.

If a plate be perfectly clean, the breath, when blown upon it, will show no spots or lines, and will quickly evaporate evenly and perfectly.

Coating the Plate.

All the steps hitherto described may be done at leisure, at any time prior to commencing to "operate," as it is technically termed. All the solutions being ready and the plates clean, the student may proceed to try a picture. A plate is taken from the box, and ascertained to be quite clean; if not, it must be rejected, or made clean. If the weather be damp, it may require a polish on a piece of clean soft chamois leather, kept for the purpose. It is then dusted with a large camel-hair brush, also kept for the purpose, and is then ready for coating with iodized collodion.

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This may be done in two ways. If the plate be small it may be held in the hand as follows:—Hold the plate by the corner (A, fig. 9) between the thumb and forefinger of the left hand, and having previously freed the collodion bottle from any particles of dry collodion which may be adhering to it, pour a quantity of the collodion on the middle of the plate; then by gently tilting the plate, firstly towards the corner D, then to A, taking care that the collodion does not touch the thumb, next to C, and lastly to B, we shall find the plate perfectly covered with the film, and the superfluous quantity in the best position for returning to the bottle; which being done, the plate is still to be kept slightly inclined so that the corner B may be lowest; and a gentle rocking motion from B to C is given to prevent the film running into streaks during the process of draining and setting. The operation of coating the plate ought to be performed as smartly and neatly as possible, as the evaporation which takes place from such an extended surface of collodion, gives rise to the loss of so much ether as to render the collodion returned from the plate almost useless, if the operation be delayed beyond a certain time; but whilst done quickly, it must be done calmly and without hurry, so as to avoid either spilling the collodion over the edges of the plate, or leaving large patches at the corners uncovered.

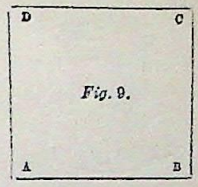

Fig. 9.

The accompanying cut (fig. 10) will convey an idea of the way in which the plate is to be held; the hands in the drawing are supposed to be those of an operator whom the student is observing.

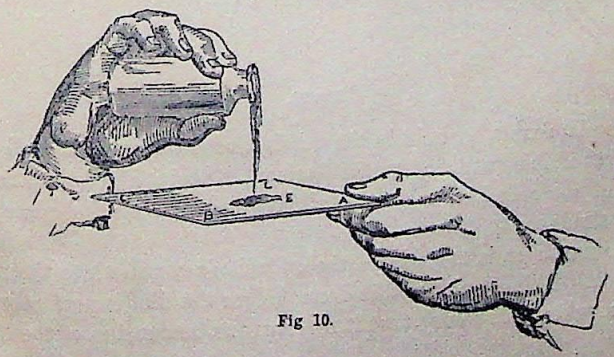

Fig 10.

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In coating large plates it is more convenient to use a pneumatic holder for holding the plate. These are of various forms, one of which is shown in fig. 11. The plate cleaned as before, is placed face downwards on a sheet of perfectly clean blotting paper, or leaning against a wall, and the pneumatic holder placed firmly against the centre; the holder on being exhausted will hold the plate firmly. Dust being removed with the large brush, the collodion is then poured on and spread as before described, the position of the hands being shown in diagram 12.

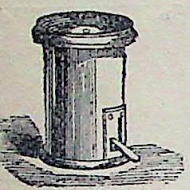

Fig. 11.

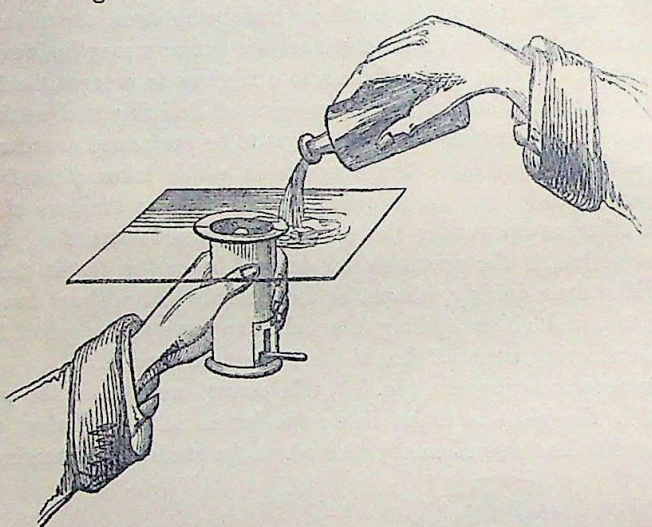

Fig. 12.

The plate must be held in the vertical position until the collodion is set, as if it be restored to the horizontal position before, a return wave of the collodion may flow a little distance up the plate and make a ridge.

The next step is to immerse the collodionized plate into the silver solution. This should not be done before the film is perfectly set, that is, when it is so dry that it receives the impression of the finger

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at its lower end, without sticking to it. If the plate were immersed too soon, lines would appear at the end which had been dipped first. If it be delayed too long, that part of the plate opposite to where the collodion was poured off, will become too dry, and the silver solution having difficulty in permeating, will cause a stain, from insensitiveness at the part. The time the film requires to set is dependent on the temperature and on the quality of the collodion. It will take from half a minute to two minutes. A little practice will be the best guide in this respect, carefully observing the film at this stage and then examining results.

Having ascertained that the film is sufficiently set, place the plate carefully on the dipper, and lower it gradually, without stopping, into the nitrate of silver solution. Any check while lowering the plate will cause an horizontal line across the film.

It may be desirable to pause here a moment, to explain what takes place on plunging the plate into the bath. The collodion is simply a vehicle used to spread over the glass a film of some iodide, or iodide and bromide, which is dissolved in it. Silver has a great affinity for iodine and bromine, and accordingly, on immersion, double decomposition takes place; some of the silver leaves the nitric acid and water, and combining with the iodide and bromide in the collodion, forms iodide and bromide of silver in the film; whilst the nitric acid liberated, unites with the base which had been in combination with the iodine and bromine. The film of collodion is quite transparent when it is first immersed in the bath; but when the process has taken place which we have just described, the film becomes semi-opaque and of a creamy or opalescent hue.

The plate must be left in the bath sufficiently long to allow all the iodide and bromide in the collodion to be converted into iodide and bromide of silver.

When the plate has been about a minute in the bath, it may be moved in and out once or twice, quickly and without pause or hesitation; this will aid the evaporation of the ether from the collodion. When the greasy-looking lines, which at first appear, are all gone, it is probable that the plate is ready for exposure; but this is not an invariable sign. The proper time depends upon circumstances, and is regulated by the following circumstances:

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-1st. By the porosity of the film. 2nd. The quantity of iodide. rd. The strength of the bath. 4th. The temperature. Generally, om two to four minutes immersion will answer the purpose. xperience will, however, enable the student to determine the roper time. At a temperature of 60° Fah. three minutes will, nder most circumstances, be sufficient.

The plate is now withdrawn from the bath, and allowed to drain or about a minute on the dipper. It is then placed with its lower dge on a sheet of clean bibulous paper, and the back wiped carefully with a sponge or a piece of bibulous paper (fig. 13). The object

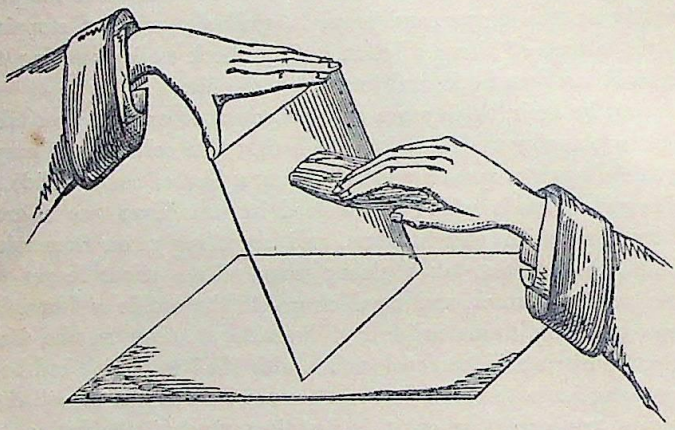

Fig 13.

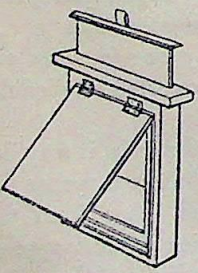

Fig. 14.

of this is to prevent, as far as possible, all draining of silver solution into the dark slide, which would be a fertile source of stains.

The plate is now placed in the dark slide (fig. 14), taking care to keep it in the same position all the time, so that any draining which may have accumulated at one end may not flow back over the plate. It is now ready for exposure.

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ARRANGING AND FOCUSSING THE CAMERA AND EXPOSING THE PLATE.

Whilst the plate is in the silver bath the camera should be prepared, and all arrangements made for exposing. Almost any object will do to practice upon, but we will presume that it is a portrait the novice desires to produce, although we may remark, by the way, that successful portraiture is a branch of photography requiring more skill and experience than any other; and that the beginner must not expect any very high degree of perfection in his first results. Nevertheless, it is probable he will wish to try this branch at the outset, and we will presume, therefore, that a sitter is ready for the plate now in the bath.

To succeed in portraiture, it is necessary to have a room properly lighted, of which we shall have occasion to speak in another chapter. The beginner will probably operate in the open air, or in a private room. If the latter can be secured with a large and lofty window, it will answer very well. A white screen, six or seven feet square, will be required to regulate the reflection of light on that side of the sitter which is turned from the window. The sitter should be with his side to the window, four or five feet from it, and about three feet behind it. The white screen should be placed parallel to the window, and about three feet on the other side of the sitter; it will be found that by bringing it nearer and removing it further away, the reflected light, on the shadowed side of the sitter, can be regulated and controlled. If the sitter be placed in the open air, a position near a wall should be chosen, so as to secure a little shadow on the figure, as, if the light fall equally all round, the picture will be flat and poor without relief or vigour. In the open air a canopy overhead is also desirable, to protect the sitter from direct vertical light, which produces heavy and unpleasing shadows under all projecting features, as the eyebrows, nose, lips, chin, &c., and sometimes gives the effect of greyness to very dark glossy hair. In all cases, the sitter ought to be so placed

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at he may be well and equally illumined, taking care that ne side of the face is in comparative shadow, and also that e eyes are protected from any great glare of light, which gives constrained expression to the face, and consequently spoils ne likeness. The aspect of light best adapted for the purpose the northern, which, of course, is free from the glare complained f. The sitter should be placed three or four feet in front of ne background. This may be formed in a variety of ways; ut the best consists of a screen about seven feet square, covered ith calico or canvas, painted in distemper or oil "flatting," ither a plain grey or with some scene to suit the taste of the hotographer. The exact character of the background is a natter of taste, into which we do not enter here. In order to

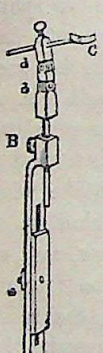

Fig. 15.

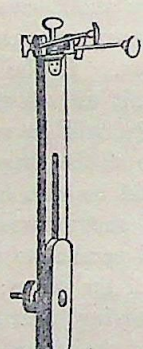
Fig. 16.

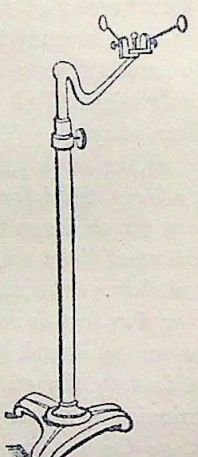
Fig. 17.

ecure a pleasing portrait, the person, whether sitting down or tanding, should be placed in an easy and graceful position; nd, as the slightest movement during the exposure of the plate ould spoil the picture, it is desirable that a head-rest should e used. This consists of a support to the head placed behind ne sitter, and may either be attached to a chair, as in fig. 15 nd 16, or, what is much better, stand alone, as in fig. 17.

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Two points require especial attention in placing the head-rest: first, that it shall be arranged so as not to cause the slightest feeling of stiffness or constraint in the sitter; and second, that it shall not appear at all in the picture.

The sitter being properly placed, the camera (fig. 18) is put

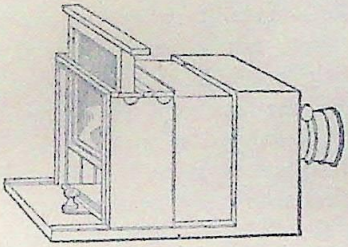

Fig. 18.

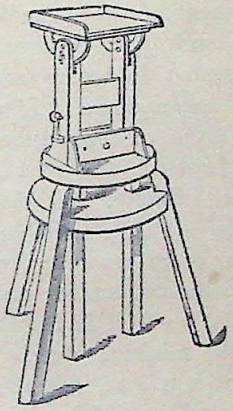

Fig. 19.

on the stand (fig. 19), and placed at the proper distance from the sitter; this will be ascertained by experiment, as it will vary with the focus of the lens, and the size of image required. The nearer the camera is to the sitter, the larger will be the size of the image, and the further it is removed, the smaller the size of the image. When the image is required large, the body of the camera must be extended, and the contrary when the image is required small. When the proper distance has been selected, and the body of the camera adjusted so as to secure an approximate focus, the rack and pinion attached to the lens may be used, so as to get the image perfectly sharp on the ground-glass. This done, the ground-glass may be removed, the dark slide containing the plate put in its place, the cap put on the lens, the front of the slide pulled up, and all is then ready for exposure by the removal of the cap from the lens.

It must be borne in mind, however, that if the operations we

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ave been describing require more time than about three minutes, ome of them should be done before placing the plate in the ath, as it should in no case remain there more than three or our minutes, neither should it stand in the dark slide beyond few minutes before exposure or development.

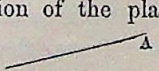
The precise time of exposure must depend entirely on the udgment of the operator; all we can do in the matter is, to ive such general directions as may assist in forming it, and ve cannot do better than by instancing cases of *under-exposure* nd *over-exposure*. If we find on developing the image that he parts of the picture that were in the best light—such as he forehead, the shirt-front, &c.—make their appearance with ome difficulty, and that the parts not so well-illumined fail o be at all perceptible, we may conclude that the plate has been under-exposed; but if, on the contrary, the parts that were in comparative shadow are developed as soon as the high lights, we shall find that too long an exposure has been given to the sensitive plate. The time may vary from a second to about a minute, depending on the light, the kind of lens, and the conditions of the chemicals.

To Develop the Image.

Having exposed the plate, it is to be developed in the dark room.

Fig. 20.

The plate, on removal from the dark slide of the camera, is to be placed on the levelling stand (fig. 20), the screws of which have been so adjusted that the plate may have an extremely slight inclination from right to left; the position of the plate is represented by this line (A B)



Then having placed the developing solution in a measure glass, it is to be carefully poured along the upper edge of the plate, namely, at (A), as quickly as possible; the inclination of the plate will cause the liquid to diffuse itself all over the plate in a continuous stream, and will prevent the formation of stains

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and streaks, which would be likely to occur if the developing solution was applied in the way described for negatives. Some operators prefer to hold the plate in the hand for developing. The plan is convenient, but the fingers get stained.

When the developing solution has completely covered the plate, the picture will begin to make its appearance, the high lights coming out almost immediately; then the half-tones; and, lastly, the parts that were in deep shadow will give indications of their presence.

Certainty in this operation can only be attained by practice; but careful examination of the finished picture will show whether the plate was over or under developed.

It is somewhat difficult for the novice to distinguish between over-exposure and over-development, and between under-exposure and under-development, as the results are somewhat similar. An over-developed plate may generally be distinguished from an over-exposed plate by the fact that the former is generally covered with a sparkling deposit of silver all over the surface, which, when the picture is dry, may be rubbed off, whilst the over-exposed plate is pale, flat, and wanting in contrast, it is at the same time free from the surface deposit just described. The under-developed picture is generally distinguished by the face and other light parts looking nearly right, whilst the deep shadows and dark drapery are too black and wanting in detail, whilst the under-exposed picture is too dark all over.

When the picture is sufficiently developed, it is well washed with water to remove all traces of the developing solution, and is then ready for fixing.

Fixing the Picture.

When the plate is quite free from the developing fluid, the solution of cyanide of potassium is applied so as effectually to cover the surface; this is for the purpose of dissolving the unaltered iodide of silver which formed the sensitive surface.

When the picture is quite free from the yellow iodide, it is to be washed in a gentle stream of water, and allowed to dry.

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Finishing the Picture.

The picture will now require backing with black varnish or dark velvet, which will form the shadows of the picture, the lights being formed by the silver deposited in development. If it be intended for colouring, it will require treating as directed in the chapter on that subject. If no colouring be desired, the surface should be protected by a suitable varnish of which several kinds are sold for the purpose. The varnish is flooded on to the film in the same manner as collodion is applied to the plate. Those varnishes known as "crystal varnishes" may be applied without heat; but spirit varnishes require the plate to be slightly warmed, and after varnishing, the warmth should be maintained for a few seconds until the varnish is dry. The picture should then be put up in a case or passepartout prepared for the purpose.

Collodion positives may be taken on other substances besides glass, such as patent leather, enamelled iron, mica, &c.; but the same principles will apply in all cases.

NEGATIVES ON GLASS.

We have already explained in a former chapter that a negative is not a picture in itself, but the plate by which an indefinite number of positive pictures on paper can be produced by means of photographic printing.

If such a plate is placed on a piece of paper, prepared in such a manner that it blackens when exposed to the action of the light, the rays of light will pass through the transparent parts of the glass, and impress the paper; while in the opaque parts no reduction will take place. Through the middle tints, the light will, of course, blacken the paper more or less, according to the degree of transparency. The picture, thus obtained upon the paper, will be a natural representation of the object as it appears to the eye, and is termed, as we have before explained, *a positive on paper.*

Although all collodion pictures on glass have somewhat the

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negative character, in the lights being opaque and the shadows transparent, yet all cannot be used to produce positives on paper. A positive on paper, printed from a positive on glass, would be very feeble, dark in the white parts, and devoid of definition and middle tints. Therefore, it is required in the negative that the deposit of silver should be proportionately thicker than in a positive. To give good positives on paper, the negative should be transparent in shadows, and of such intensity in the high lights, that the light can, with difficulty, be transmitted, and this must be combined with a natural gradation in the middle tints. One of the most important points to the beginner is the knowledge of a good negative when he sees it. A little and careful observation and experience will teach this better than written descriptions. Where it is possible, the sight of one good negative will be of very great value, and often save much trouble. In regarding the printing qualities of a negative, it must be remembered that the absolute intensity does not depend entirely on the thickness of the deposit of metallic silver, but to a great extent, on the colour it has when viewed by transmitted light. Some negatives are translucent, and of a brown yellow; others of a dark bluish black; others are grey, &c. It is easily understood that a brown yellow negative will be a great deal more opaque to the chemical rays than one that is grey, supposing the deposit, in both cases, has the same thickness; so that often negatives having comparatively a slight intensity, or opacity, will give very good positive proofs. The colour of negatives depends on so many causes, that it is impossible to determine them all. The condition of the bath, the nature of the developer, the quantity of acetic acid contained in the developer, the presence or absence of organic matter in the silver bath, the time of exposure to light, are the principal causes. No positive rules can, therefore, be given to determine whether a negative is intense enough or not. This can only well be seen when a positive has been produced from it, as we have already observed. A few days' practice will, however, teach on this particular point more satisfactorily than any written instruction.

With these few remarks on the kind of photograph to be

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obtained, we proceed briefly to explain how to produce it. We say briefly, because the manipulations are in many respects similar to those in the positive process.

The glasses must be cleaned as for positives; but it is desirable to use, in all cases, patent plate glass, to ensure the negative from breakage by the pressure of the printing frame.

Collodion.

Collodion expressly prepared for negatives must be generally used, in order to secure the proper intensity. In another part of this work we shall describe the manufacture of collodion, for the benefit of those who are desirous of preparing their own. The beginner will generally purchase what he requires ready for use.* For his present guidance, we may mention that two varieties of collodion are sold for the purpose,—the simply iodized collodion, and the bromo-iodized collodion. Of these, the latter is most suited for development with iron, and the former with pyrogallic acid; each is hereafter described.

Silver Bath for Negatives.

In producing positives, we aim at securing a thin pure white deposit of silver, and the presence of nitric acid is valuable. In taking negatives, we require a different result, and it is necessary to have the solution for negatives as little acid as possible. Great care is, therefore, necessary, to procure a sample of pure neutral nitrate of silver. Nitrate of silver, which contains free nitric acid, is generally contaminated also with another substance, the result of the action of nitric acid on organic matter.

Having obtained the purest recrystallized nitrate of silver possible, make the bath as follows:—

Nitrate of silver (pure recrystallized)...	... 35 grains.
Distilled water	... 1 ounce.

* There are many good collodions manufactured, but we may here recommend as of uniformly good quality those made by Mr. Ponting.

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This having been saturated with iodide of silver, as described for the positive bath, a picture may be tried. If it be clean and intense, free from fog or streaks, it is fit for use. If, on the other hand, the plate be fogged, or covered with streaks, or if the image be thin and grey, it is probable that some impurity is present in the nitrate of silver. To get rid of this, add a few drops of a solution of bi-carbonate of soda, containing ten grains to the ounce, until a slight turbidity is caused in the silver solution. Then place it in sunlight for a few hours, which will blacken and reduce any trace of organic matter which may be present. Now filter and add a minim of pure glacial acetic acid to each ounce of solution, and it will be fit for use.

The bath once in order will not usually require alteration. It will sometimes happen that it may, from a variety of causes, get out of order. For instance, the use of very dark coloured collodion, containing free iodine, developes nitric acid in the bath. When such collodion has been used, and the appearance of the negative is pale, and without the required intensity, the solution must be tested, and if found very acid, neutralized by the addition of a few drops of a solution of carbonate of soda, until the liquid becomes permanently turbid. It should then be filtered, and made faintly acid again as at first.

As a general rule, however, the bath should not require anything but keeping up its strength and bulk, by adding from time to time from a stock bottle containing a forty grain solution.

Exposure for Negatives.

The exposure will, of course, vary with the subject, the light, the lens, and the condition of the chemicals; but, as a general rule, it will be two or three times as long as for positives.

Developing Negatives.

Negatives may be developed either with a solution of protosulphate of iron, or of pyrogallic acid. With the former it often happens that they require a further process of intensifying, as

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the image produced is generally thin. With the latter sufficient intensity is obtained at once, but the plate often requires longer exposure.

A developing solution of pyrogallic acid is made as follows;—

Pyrogallic acid	1 grain
Glacial acetic acid	15 minims
Alcohol	10 minims
Distilled water	1 ounce.

In warm weather the quantity of acetic acid may be increased, and in cold weather it may be diminished, or the proportion of pyrogallic acid increased. The alcohol is added to make the solution flow more evenly over the plate. This solution decomposes after a few days, and becomes brown, so that it is advisable to make only a small quantity at a time. If, however, made four or five times more concentrated than it is required for use, it will keep longer. In such cases it can be diluted with pure water as required. For use it should, however, never exceed three grains of pyrogallic acid to the ounce of water.

The plate having been exposed, proceed in the same way as in developing positives. A quantity of the pyrogallic acid solution sufficient to cover the picture having been filtered into a clean glass, is poured carefully and evenly over the plate, which is either held in the hand, or placed on a proper holder, the same care being taken to cover it quickly and regularly to avoid lines as in positives. The plate must be kept in motion, and must be carefully watched; the image will come up somewhat in the same manner as in a positive at first, but with more vigour and boldness, and the development must be carried to a much greater extent. After developing a while, the solution may be thrown off into a clean glass measure or developing cup, and the plate held up to the yellow light in the manner shown in the engraving (fig. 21). If it has been properly exposed in the camera, and developed sufficiently, the picture will appear clear and distinct, very black and dense in the high lights, quite transparent in the shadows, and the half tones with their proper

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gradation of semi-transparency. If the high lights do not appear sufficiently dense, a few drops of a twenty-grain nitrate of silver solution may be added to the developing solution in the glass, and well mixed; the plate is again to be treated with this mixture, pouring it off and on the plate, until the proper density is attained. If the plate has been under-exposed, the high lights will become very dense, but there will be very little half tone, and no detail

Fig. 21.

in the deep shadows. If it has been over-exposed, there will be very little contrast, the high lights will probably not be dense enough, and the shadows will be over done. But experience alone will teach the beginner to distinguish, by its appearance in development, exactly the right qualities in a negative.

When it is sufficiently developed, the plate must be washed and fixed.

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If protosulphate of iron be used for developing the negative, some difference in the manipulation and general treatment is necessary. A much greater latitude is permissible in the strength of the solution, which may vary from five grains to fifty in an ounce of water. The following will, however, be found a useful strength :—

Protosulphate of iron	... 15 grains
Acetic acid (glacial)	... 5 minims
Alcohol	... 20 minims
Distilled water	... 1 ounce.

The exposure with iron will generally be shorter than with pyrogallic acid, and the development more rapid. It must not be continued, however, for so long a time as with pyrogallic acid. As soon as all the detail has appeared, the plate must be washed, whether it has acquired sufficient intensity or not. If not it must now be treated with pyrogallic acid and silver, in order to obtain intensity. The solution for this purpose may be prepared as follows :—

Pyrogallic acid	... 2 grains
Citric acid	... 1 grain
Distilled water	... 1 ounce.

Pour this over the well washed plate until it flows free from greasy lines; then return it to the developing glass, and add a few drops of a twenty-grain nitrate of silver solution kept for the purpose, and continue pouring off and on, examining the plate at intervals, as described before, until sufficient intensity is obtained. Then wash and fix.

Fixing the Negative.

Cyanide of potassium may be used for fixing the negative, in the same way as described for positives; but hyposulphite of soda is better, and is not so apt to impoverish the density of the image. It is made as follows :—

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Hyposulphite of soda	...	...	...	1 ounce
Water	...	...	...	2 ounces.

This may either be poured on the plate, or it may be used in a dish or dipping bath. Very thorough washing of the film afterwards is necessary, as the hyposulphite of soda is not so easily removed as cyanide of potassium. Care is required in this operation to prevent the film from being broken, and also from being washed off. The former mishap may be prevented by pouring the water over the plate from a very small elevation, and the latter by not allowing the stream to play on any part of the film that is not attached to the extreme edges of the glass plate.

Varnishing the Negative.

Before we can print with safety from the negatives obtained by the collodion process, it is necessary to protect the film from injury, and at the same time, to take care that the varnish that we use possesses the qualities of transparency and hardness. The varnish usually employed is a spirit varnish, and the best mode of applying it, is to warm the plate gently by the fire, to prevent it from becoming chilled; then pour on the varnish in the same manner as recommended while treating of the collodion film, returning the superfluous quantity to the bottle. A fragment of blotting paper is to be passed along the edge of the glass where the varnish has become thickened, in order to remove the same. On holding the varnished side of the plate to the fire for two or three minutes, the varnish will become quite dry, and when cold will be perfectly hard.

The precautions necessary in the varnishing process are, first, not to make the plate too hot before coating it with varnish, as this causes it to crack at some subsequent period; second, not to allow the plate to get cool before the varnish is quite dry, otherwise, instead of a beautifully hard transparent film, we shall have one nearly opaque and of a granular appearance, owing to the varnish having become chilled. If the varnishing operation has been skilfully conducted, there is a great difficulty in determining on

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which side of the glass the picture has been formed, without referring to the corner by which the plate has been held.

Although the above plan answers perfectly, it is not always convenient to have a fire at hand in order to warm the plate; we have, therefore, devised another varnish, called Benzoin Varnish, in which the solvent is chloroform, which does not require the plate to be warmed. This varnish is applied to the plate in the same manner as collodion, and the superfluous quantity being returned to the bottle, the plate is dry in a few seconds; the film being protected by a beautiful hard film of varnish.

We cannot overrate the value of this preparation, for, from the ease with which it is applied, and the certainty of a successful result, it is invaluable in the hands of the amateur.

When the varnish is quite hard and dry the negative is fit for printing.

THE PRODUCTION OF POSITIVE PRINTS.

The reader has learnt that the negative is simply a plate from which to print, by means of light, positive copies on paper. There are several methods of doing this, chiefly distinguished as the albumenized paper process, and the plain paper process. In the first mentioned, which is most commonly practised, the paper is coated with a thin film of albumen in order to give it a finer surface, and make it render more perfectly the delicate tones and gradations in the negative.

It may be desirable to explain here that photographic printing, like taking positives and negatives on collodion, is based upon the action of light on a sensitive salt of silver. It differs from the collodion process, however, in this respect:—in the latter the action of light is to produce a latent invisible image, which is rendered visible by a developing solution. In the usual printing process, the image is produced by the direct action of light, which is continued until the picture is fully produced. Instead of using the iodide and bromide of silver for the purpose, it is customary to use the chloride of silver, which salt blackens most readily under the action of light,

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without the aid of a developer. The paper is saturated with some soluble chloride, and then placed on a solution of nitrate of silver, when a reaction takes place, similar to that produced on immersing a collodion plate in the silver bath, and the paper receives a coating of chloride of silver.

Albumenized Paper Process.

It is the custom of most photographers to purchase their paper ready albumenized, not only because it saves much trouble, but because it can be done much better in large quantities, and by those professionally engaged in its preparation, than by photographers themselves. For the benefit of those, who, residing abroad, may not be able, at all times, to procure it ready prepared, we give brief directions for albumenizing.

Take :—

Chloride of ammonium	20 grains
Distilled water	½ ounce
Albumen (or white of one egg)	1 „

The salt should be dissolved in the water first, which should be added to the albumen; the whites of new-laid eggs should be always used. The mixture must be whipped or beaten until it runs clear and limpid. It is then to be left to settle, and then whipped again, and left. When required for use, poured off, without disturbing the sediment, into a clean flat photographic dish.

The paper, which may be *Saxe* or *Rive* paper, according to the class of results required, the former giving greater softness, the latter more brilliancy, should have been cut to the proper size to suit the dish. The beginner will do well to begin with quarter sheets. Care should be taken also to select and mark the smoothest and finest side for contact with the albumen. The room in which the operation is performed should have a fire, and be at a temperature of not less than 70° Fah.; ten or twenty degrees higher would be better, as much of the evenness and beauty of the result depends on the rapid drying of the albumen.

With the solution in the dish, and the surface free from bubbles

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or scum, the paper laid ready with the smoothest side downwards, proceed to work. Take up a sheet by two corners opposite each other, allowing it to drop in a curve, as in fig. 22.

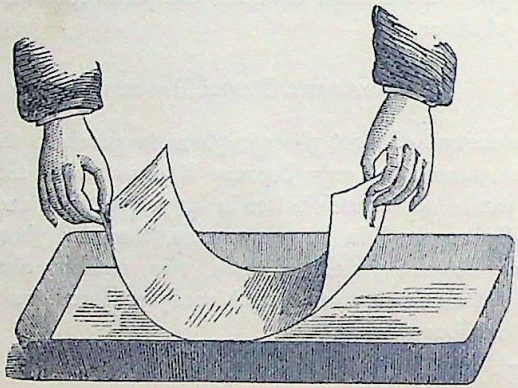

Fig. 22.

The centre of the curve is then to be brought in contact with the solution in the pan, and the ends of the sheet gently lowered until the whole of the surface is in contact with the liquid. Care is required to prevent the formation of air bubbles, but a little attention and caution in manipulation will prevent their occurrence. The paper must lay on the solution about a minute, and then be lifted up carefully, drained, and hung up to dry.

It is almost needless to remark that this part of the process may be conducted in open daylight. The paper thus salted may be preserved in a portfolio for an indefinite period, provided it be not subjected to the action of a damp atmosphere, and is ready at any time to be rendered sensitive in the manner following; the operations to be performed in the dark room.

Make a solution as follows:—

Nitrate of silver	...	...	...	2½ ounces
Distilled water ...	...	...	...	20 ,,

This is to be carefully filtered into another shallow pan kept for the purpose, and a sheet of the albumenized paper floated on to it, in

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the same way as on the albumen, taking especial care that all air bubbles are excluded between the paper and liquid. Suffer the paper to remain on the solution undisturbed for three minutes, and carefully remove it, and hang up by one of its corners to dry as before. When dry, the paper is fit for use. The drying is facilitated by placing a small piece of bibulous paper at the bottom corner, which will absorb the drainings of the sheet.

It may be desirable here to mention that, besides giving a finer surface to the paper, it affects the colour and quality of the image, by forming, with the silver, a compound salt, which is acted upon by light differently to chloride of silver alone. The image is more vigorous, and of a redder colour. The greater the proportion of albumen used in preparing the paper, the more vigorous will be the image and the redder its tone.

Plain Paper Process.

For some purposes plain paper is preferred to that with the albumenized surface. It may be purchased ready for use, or it may be prepared as follows:—take the paper cut to proper sizes, and the smooth side marked as before described, and float upon the following solution:—

Chloride of ammonia	10 grains
Distilled water	1 ounce.

Sufficient of the solution to fill a clean, flat dish, such as has been used before, must be made. The paper is then floated, as before described, the marked side downwards, on the solution for three minutes. Any quantity of paper can be thus prepared at one time, and preserved ready for exciting. This, as the albumenizing, can be done in daylight. The paper is rendered sensitive in the same manner as albumenized paper, by floating on a similar solution.

All the operations with silver solutions must be done in the dark, or by the aid of yellow light, and the sheets pinned by one corner to a lath or piece of cord stretched for the purpose, and hung to

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dry in the dark. Only the quantity required for immediate use must be excited at a time, as it spoils with keeping. The paper should be kept dry and in the dark room, where subsequent processes, until the picture is fixed, should be performed. It is best prepared fresh every day when required, but in cool, dry weather may be kept a day or two without serious injury.

Exposing in the Printing Frame.

In order to print a positive on paper from a negative, a *printing frame* is required. This (fig. 23) consists of a frame of wood, a little larger than the negative. In the front of the frame is a stout piece of plate glass. Upon this the negative is placed, with film side upwards; the sensitive paper is laid upon the negative; and the back of the printing frame consisting of wood covered with cloth or velvet, is placed upon paper and fastened down into the frame by catches. The pressure is regulated by screws or springs, so as to keep the paper in firm contact with the negative, without risk of cracking it by too much pressure. When the frame is turned with the glass up, it will be seen that the paper is under the negative, through which the light passes, darkens all parts of the paper, to which, through the transparent and semi-transparent parts of the negative, it has access.

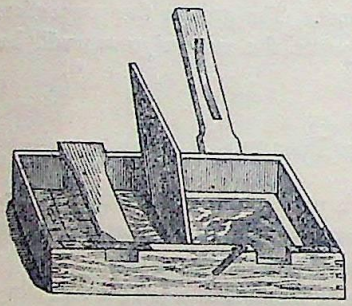

Fig. 23.

As it will be necessary to examine the progress of printing from time to time, the back of the printing frame is in two pieces, hinged together, and each half is held down by a separate bar, so that one can be unfastened at a time to examine the progress of the printing, whilst the other holds the print firm and prevents it from moving.

The printing frame should be exposed in a good light, either diffused or direct sunlight. An intense negative with strong contrasts is best printed in direct sunlight; a thin, soft, or feeble

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negative in diffused light. The print will always require printing a little deeper than is required in the finished picture, as it will lose a little depth in the subsequent processes of toning and fixing. The exact depth will be learned by experience.

Before placing the negative in the frame, see that the glass, and also the back of the negative, are quite clean. The paper must be quite dry, and care should be used to avoid touching the sensitive surface with the fingers. Putting the paper in the printing frame, examining its progress, and all operations, as we have before explained, with sensitive paper, must be done with the aid of *yellow* light.

Toning the Print.

All the prints produced during one day may be put away in the dark until the printing is finished, so that the toning, &c., may be done together. Before toning, the prints are to be well washed in several changes of clean water, in each of which they may be left to soak a short time. The object of this is to remove the free nitrate of silver, which would decompose the toning bath. They are now to be placed in the *toning bath*, made as follows:—

Chloride of gold	1 grain
Carbonate of soda	5 grains
Distilled water	6 ounces.

The colour of gold when in a state of fine subdivision is a rich purple, and a precipitate of gold is thrown down on all the black parts of the print which contained reduced silver. The prints will rapidly assume a purple tint, and finally a black tone; they should be suffered to proceed a little further than is required in the finished print, as they will lose a little depth in the subsequent fixing process. Not more than from half-a-dozen to a dozen prints at a time should be immersed, and these should be kept in motion and prevented from sticking together, or irregular patches will be the result. With some samples of paper, especially if the temperature be low, the tone proceeds rather tardily, and the solution may be warmed to about 80° Fah. When the required depth is acquired,

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the prints should first be removed to a dish of water and washed, and then they are ready for fixing.

Fixing the Print.

The operation of fixing the print consists in removing all the unaltered chloride of silver from the paper. As this is not soluble in water, the print requires to be placed in a bath which will dissolve the chloride of silver. This is made as follows :—

Hyposulphite of soda	...	...	...	1 ounce
Water	...	...	...	5 ounces.

The print should remain in this bath about a quarter of an hour. If the bath gets weak, a larger time would be required. But as this solution is apt, on becoming old or acid, to decompose and liberate sulphur, and as sulphur is very detrimental to the permanency of the print, it is recommended that this bath be made fresh for every batch of prints ; if great care be taken, however, to preserve a slightly alkaline reaction (by the use of a little chalk), and to renew its strength by fresh crystals of hyposulphite of soda, from time to time it may be used over and over without disadvantage.

After the print has been a little overtoned, it is to be washed, so as to free it entirely from all traces of hyposulphite of soda, as the slightest portion remaining will continue to act upon and injure the picture. To effect this, the print, on first removing from the fixing bath, must be washed in successive waters for about five minutes, then left to soak in fresh water for a quarter of an hour ; this must be poured off *entirely*, and the process repeated five or six times. If it can be placed under a continuous stream of water for a few hours, the result will be more certain. In any case it must be placed in plenty of water, and allowed to soak for six or eight hours at least, in order to remove every trace of hyposulphite of soda, which would eventually cause it to fade, if present even in the smallest quantity. Suspension in a warm place to dry, and subsequent ironing or hot-pressing, and mounting, will complete the process.

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The processes of toning and fixing just described may be applied to prints on either albumenized or plain paper.

Mounting the Print.

The mode of mounting will be governed largely by the taste of the photographer. Cases, passepartouts, or plain cardboard may be used; but in all cases the print will require to be attached or "laid down" on to cardboard, and it is important that the adhesive material should not act injuriously on the print. Sour paste or acid gum would do this, and should be avoided. Gelatine, good glue, or starch paste may be used with advantage, but each should be used when fresh made.

TINTING POSITIVES ON GLASS AND PAPER.

As the amateur will frequently desire to tint his productions, and endeavour to give them something of the hues of life and nature, we append, by permission, some instructions, condensed from an excellent work on the subject, entitled, "Harmonious Colouring as Applied to Photographs."*

For colouring glass positives, and sometimes paper prints, powder colours are used. They are used, as we have said, in the form of an impalpable powder, and are prepared so as to adhere to the surface of the picture by the simplest manipulation.

The colours are prepared in all the suitable tints for flesh, draperies, and backgrounds; and the student is recommended to provide himself with a proper equipment.

It is absolutely necessary that the colourist should have good and suitable pencils to commence with; nothing will be more likely to cause him to throw up the attempt in disgust than unsuitable pencils, by which it is impossible to apply the colour properly.

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* The Principles and Practice of Harmonious Colouring, in Oil, Water, and Photographic Colours, especially as Applied to Photographs. By an Artist Photographer. Newman: Soho Square.

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They should be of the best material, and manufactured so as to carry a firm, well-supported point. This should result from the careful selection and arrangement of the natural points of the hair, and not from being *ground* to a point—a practice resorted to by inferior makers to gain a factitious point. For general purposes, Nos. 1 and 2 camel's hair will be found most useful. They should be prepared for use from time to time by briskly agitating in a glass of clean water, and then drawn through the lips to form a point, in which form they must be suffered to dry, and are then ready for use. A good stock ready pointed should always be kept at hand, as it is not desirable to use the same pencil for dissimilar colours. A few larger camel's hair pencils will be found useful in backgrounds, and a few small sables for fine lines. Common pencils, which at once spread into the form of a dusting brush when dry, are worse than useless.

In addition to colours and pencils, an elastic india-rubber bottle, with tube, will be required for blowing off superfluous colour, as blowing with the lips should in no case be attempted, on account of the danger of spotting the picture with moisture. A large camel's hair dusting brush, gold and silver shells, and a bottle or tube of Chinese white, will also be required.

The colourist will find his account in procuring at the outset a complete box of colours, in which he will find the best possible selection of tints for flesh, draperies, backgrounds; and also a complete assortment of pencils, and other requisites for his purpose. Facilities for plenty of variety in colouring will make the work easier, because more interesting to the colourist, as well as more satisfactory in result.

A varnish suited to the purpose should be used. It should not present a hard glassy surface, off which the colours must blow like dust; but a surface which, whilst entirely free from all "tackiness," should, nevertheless, present a tooth to the colour.

Method of Colouring.

The positive on glass may be coloured either on the collodion surface, or varnished and then coloured. In the first case, the

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picture is first coloured on the collodion surface. It is well, perhaps, to commence on the forehead, using flesh No. 1, fair or dark, as the complexion may require. A small portion of colour is taken up on the pencil, and applied with a circular motion, on the high lights first, and gradually softening towards the shadows, taking care at all times not to overload these with colour, or the roundness of the picture will be destroyed. Having coloured the lights of the forehead, nose, and chin, with No. 1 flesh, now with No. 2 flesh, fair or dark, commence on the lights of the cheeks, softening into the shadows, and joining the high lights already coloured. The outlines of each feature must be carefully traced, and caution used to avoid covering the shadows of the mouth, nostrils, &c., as well as to avoid touching the hair or eyes with flesh colour. Proceed in like manner with the neck, arms, hands, &c. The hair, if golden or red, may now be coloured, touching only the lights and half tones, and avoiding the deepest shadows.

An even, delicate coating of flesh colour having been obtained, proceed with the draperies. In colouring draperies, proceed on the same principle as in flesh, commencing on the lights, and softening into the shadows. Great care is here required to avoid covering the deepest shadows and destroying their transparency.

The first colouring completed, carefully blow away with the india-rubber bottle every particle of colour which has not adhered to the surface, otherwise it will run with the varnish. Before varnishing, also observe if there are any spots or imperfections in the picture. Black spots, which will occasionally occur in the background of otherwise good pictures, may be carefully touched out with a little of the Chinese white, modified with such other water colour as most nearly resembles the tint of the background. If the eyes have moved, or are not perfectly sharp, they may, if the colourist possess sufficient skill, be touched with water colours, the pupil defined and the markings of the eyelash deepened, and the light put in with a little Chinese white. But it must be remembered this requires great care, some skill, and knowledge of the actual drawing of the eye. Without these it is more easy to spoil than to improve the picture by the attempt.

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The picture is now to be varnished, blowing carefully to remove the dust, &c.; the varnish is to be flooded on to the plate in the same manner as collodion, and with the same care to secure an even coating, and drained off at one corner. A dusty atmosphere should be avoided whilst varnishing the picture.

When quite dry, the picture is again ready for colouring. Proceed as in the first instance, but with the remembrance that now the colours are to be used exactly of the tint and brilliancy required; the high lights are recoloured with No. 1 flesh; the local tint with No. 2 flesh; fair or dark, as may be required; the cheeks heightened with Nos. 2 or 3 complexion. Great care must now be taken not to destroy the roundness and relief of the face by entirely covering the half-tones and shadows with flesh colour. If the colourist have sufficient skill, a great improvement may be obtained by delicately touching the shadows with an approximation to the requisite shadow colours of flesh. A little damask and green form a useful grey for this purpose in dark or florid complexions, the green prevailing in the former, and the damask in the latter. For very fair complexions, the peach forms a delicate shadow colour, giving, as it combines with the flesh, an approach to the "pearly tints" of the water-colour painter. The lips may now be touched with the colour for the purpose, modified as the case may demand. The upper lips, being in shade, must be touched with very great care to receive very little colour, as there is danger of making it appear swollen. The nostrils may be touched with carmine or damask. The iris of blue or light grey eyes may be touched with a suitable colour; but dark eyes, grey or hazel, are best untouched. For colouring the lips, eyes, and similar fine lines, a small sable pencil is most useful. The eyebrows and hair, where required, are now to be retouched.

Proceed with the draperies in the same manner. Great care is required to preserve the peculiar texture of various fabrics, which is rendered with such delicacy and faithfulness by photography, and which it is very easy to spoil by colours.

The background is next to be coloured. To produce the best effects requires some skill and judgment, and much more of the

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beauty of the picture depends upon its management than most photographers seem aware of. If a plain background be intended, three points should be remembered regarding it:—Such colours should be chosen as best harmonise with, and give value to, the colours in the model; it should be so subdued and devoted to repose as never to distract attention from the principal figure; and it should be so relieved by light and shadow as to give an atmosphere to the picture, and in no case suggest the idea of the figure being inlaid. Almost every colour may be used in backgrounds, but various combinations of the greys, greens, browns, and purples are most useful for the purpose, and admit of endless variety. The background should be shadowed towards the lower part of the picture; and a light thrown on to the upper portion, in the same direction as the light falls on the head of the sitter, has a good effect. No. 3 brush is best for producing a smooth, even background, a smaller pencil being used to bring up the colour to the outline of the figure.

After finishing the background and draperies, once more retouch the face, which will now appear somewhat modified by the surrounding colour.

Lace, flowers, and jewellery may, where necessary, be delicately put in with water colours, or the latter with gold moistened from the gold shell. Silver ornaments may be put in with the silver shell, or, what is perhaps preferable, the aluminium shell, a new invention, which, we believe, though not so brilliant, will not tarnish. But care must be used not to give a vulgar, inharmonious effect to the picture, by using too freely gold or silver in ornaments.

When the picture is quite coloured, a clean pencil with a fine point should be taken, to remove such portions of the colour as may accidentally have touched the shadows of the hair or draperies. Sometimes the point of the pencil may be touched against the hair or skin of the colourist, so as to take up the merest *soupçon* of animal oil, by which means the superfluous colour on the plate is easily removed.

Positives on albumenized paper, or on salted paper, may be tinted in exactly the same manner. If more elaborate finish be required,

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it must be effected by means of oil or water colours, for instructions in applying which, see the work we have been quoting.

THE METHOD OF TAKING STEREOSCOPIC PICTURES.

Before entering upon the details of the plan by which stereoscopic pictures are produced, it may not be out of place to endeavour to put the reader in possession of the theoretical principles on which the stereoscope depends for its action. If we stand in a room, and look through a window at objects on the opposite side of the street, we can pronounce of a certainty that the horse there waiting patiently for its rider is possessed of three dimensions—namely, length, breadth, and thickness; in fact, that it is, as far as vision is concerned, a solid body: now, by what means is this conviction as to three dimensions formed in our minds? It is by the impression formed on the brain, through the optic nerves, of two different images of the object, one formed on the retina of the right eye, the other on that of the left; for while still looking at the same object, if we close the right eye, and notice what part of the animal is intersected by a bar of the window, and then close the left and open the right, we shall find in the second case the same bar intersects quite a different part of the horse, clearly showing that on the retina of each eye we have formed quite a distinct image of objects at which we are looking; it is the combination of these two images, through the agency of the optic nerves, that gives rise to our notions of solidity in objects presented to our notice.

Bearing this in mind, then, it is not difficult to conceive how it may be possible so to take, by means of the camera, two images similar to those seen by the right and left eye, and then, through the medium of an instrument called the stereoscope, which permits each eye to see its own picture only, so to combine these pictures as to render to the mind the idea of solidity of the object viewed. These conditions have been realized, and with the aid of photography, we are enabled to bring to our homes views of distant regions and works of art, that convey most exact ideas of locality and of the peculiar features of the subject under consideration.

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The stereoscope, as an optical instrument, exists in two forms—namely, the reflecting stereoscope, as originally designed by Professor Wheatstone, and the lenticular or refracting stereoscope of Sir David Brewster; each of these instruments possesses advantages peculiar to itself, the reflecting one being suited to the exhibition of views of any size, while the lenticular stereoscope is only adapted to pictures of small dimensions.

The reflecting stereoscope (fig. 24) consists essentially of two mirrors, set at an angle of 90° to each other; opposite these mirrors,

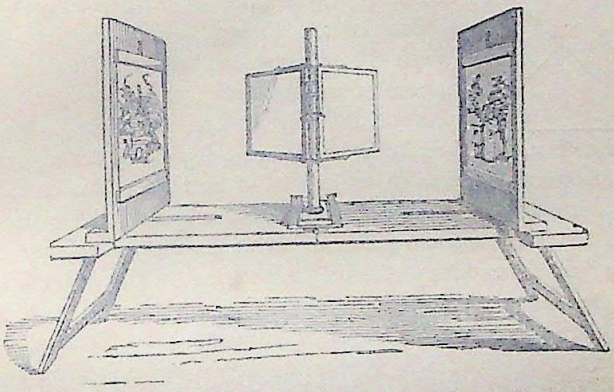

Fig. 24.

suitably supported, are placed the pictures to be viewed; the frames that support the pictures admit of every adjustment, so that the two images, as seen by the eyes placed opposite the mirrors, may be made to coincide.

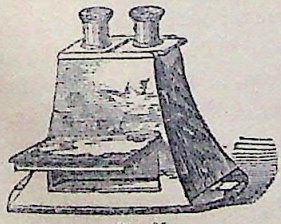

Fig. 25.

The lenticular stereoscope of Sir David Brewster (fig. 25) consists of a box, shaped as in the figure, at the broad end of which the pictures are placed; immediately opposite these pictures are situated the eye-pieces that contain two lenses, or two prisms, so placed that their centres are coincident with the pupils of the eyes; so that, instead of two pictures

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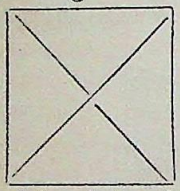
seen side by side, we have one picture visible in the apparent centre of the instrument, giving the true stereoscopic effect.

Stereoscopic pictures may be taken by an ordinary camera, or by cameras specially adapted for that purpose; for large pictures, the ordinary landscape camera can be used with advantage: the mode of procedure is as follows:—Place the camera in the true position for taking the views, and having previously made a cross in pencil on the ground focussing glass, so as to intersect the centre of the



picture thus, note, when focussing, the particular object or part of an object that falls on the intersection of the lines; then take the picture. When the exposure has been sufficient, move the camera and stand bodily, as nearly parallel to the plane of the view as possible through the space of four feet, and then focus for the second picture, taking care that the image of the same object or part of an object falls on the point of intersection of the lines on the focussing glass; the picture may then be taken, and when the negatives thus produced are printed from, and the results placed on their respective sides of the reflecting stereoscope, a most magical effect is produced, for on looking into the mirrors with both eyes, and adjusting the pictures so as to coincide, the views will appear in perfect relief; every part will show itself in its proper position, and the effect of solidity will be given to every object in the composition.

For small views used in the lenticular stereoscope, and for portraits, we use either of the cameras represented below. Figure 26 represents a stereoscopic camera of the most simple form: it consists of a long camera box, with a dark slide to hold the plate on which the two pictures are to be taken; the front which carries the lens is so made as to slide from side to side; the method of using the instrument is very simple—the camera is placed immediately opposite the object to be taken, and the front carrying the lens is moved to one side: the object being focussed, the prepared

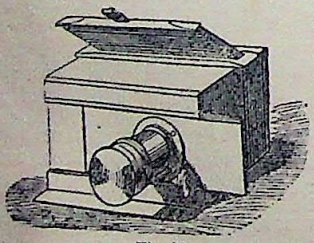


Fig. 26.

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plate is then placed in the dark slide, and substituted for the ground focussing-glass. Now uncap the lens and expose the one half of the plate, replace the cap, and then shift the lens to the other side, and expose the other half for the same length of time. On development, the pictures, if properly exposed, will come out of the same intensity, and of uniform appearance. The negative thus produced can be printed from in the usual way, and the resulting pictures being mounted on card, can be viewed in the lenticular stereoscope, where all the peculiarities due to the manner in which they have been taken will manifest themselves. There is one point to which we must draw attention in mounting the pictures taken with this instrument, namely, that they must be placed on the mounting card in the reverse position to that which they occupy when on the glass, otherwise, it is obvious from what has before been explained, that the true stereoscopic effect cannot be obtained.

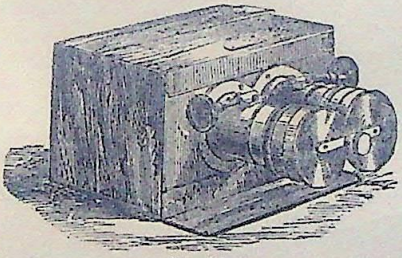

Fig. 27.

Figure 27 represents a camera on the same principle, but fitted with two lenses of precisely the same focus; the caps of these lenses are so connected together that they may be removed simultaneously, so that by this arrangement it is possible to take both pictures at the same instant; this will be found particularly convenient when the object is likely to move, as in the case of a portrait, where it is almost impossible for the sitter to keep in one position for any great length of time.

The same remark holds good in the use of this camera as with the last, with regard to mounting of the finished pictures—in order to obtain the true stereoscopic effect, we have to reverse the position of the pictures, as before explained.

Figure 28 is a drawing of another form of stereoscopic camera, and is adapted for taking views as well as portraits; it consists of an ordinary portrait camera, mounted on a board, which is furnished at its bottom with bars of wood; these bars are so fitted as to admit of adjustment, in order that the camera may be moved

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from right to left, and *vice versâ*, either on the same plane, or in the circumference of a circle; the back of the camera is so constructed, that the portion of it that holds the glass plate can slide from side to side; this is accomplished by means of a silk cord and spring attached to it, and also to an immovable pillar on the base board of the apparatus. When a picture is to be taken, the sliding back is to be removed, and replaced by the ground focussing-glass; the camera is then moved to the left as far as it will go. The focus being taken, and the position of any object marked on the screen, the camera is to be moved in the opposite direction until it comes to a stop; if the object before noted occupies the same spot on the ground glass, we may consider the adjustment perfect: but if not, we must alter the parallelism of the bars by means of the adjusting screws, and make a second trial.

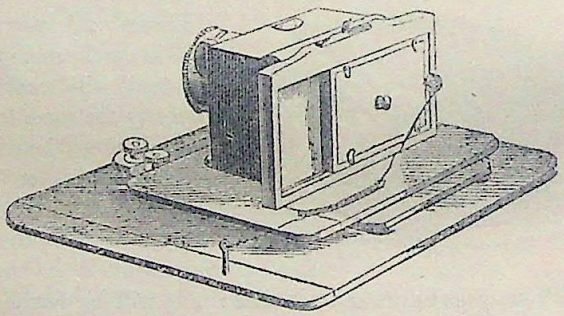

Fig. 28.

When the two images occupy the same relative positions on the ground glass, we place the prepared plate in its proper position, and draw the camera to the left, the right-hand side of the plate being opposite the lens; uncap the lens and expose the plate, then replace the cap, and move the camera to the right hand; this motion will cause the slide that holds the plate to present its left side to the opening before the lens; again uncap the lens, and take the second picture. The negative thus produced may be printed from, and the resulting positives mounted in the same relative positions as they occupied on the glass plate.

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IMPERFECTIONS AND FAILURES IN POSITIVES AND NEGATIVES.

Failures are said to be the stepping-stones to success; but they can only be so when their causes are carefully traced, in order that they may be avoided. As failures will inevitably arise in the outset of the student's practice, we shall endeavour to point out the symptoms which may lead to a knowledge of the sources of evil, and indicate the remedies to be applied.

Fogging.—This term is used to describe the grey-looking veil which obscures both lights and shadows, which appear as if seen through a mist.

This defect may occur in either collodion positives or negatives, and may arise from a variety of causes. It may proceed from an alkaline condition of the exciting bath. This may be ascertained to be the case by testing with reddened litmus paper. The remedy is to add to the negative bath glacial acetic acid until a slightly acid reaction is induced; to a positive bath a drop or two of nitric acid may be used until the same result follows. If the bath is in proper order, fogging may proceed from diffused white light having obtained admission into the dark room, or into the camera. Direct sunlight striking the lens will also produce a similar result. Over-exposure of the picture, or over-development, will at times produce a somewhat fogged appearance; the developing solution used too strong, or with too little acid, has a similar effect. Ammoniacal or other vapours in the operating or dark room have a similar tendency. A very common cause of fogging is the presence of organic matter in the nitrate bath. The best mode of getting rid of this is by first neutralizing any acid in the bath, by the addition of a few drops of a solution of bicarbonate of soda, containing about ten grains to an ounce of water. Sufficient of this must be added to cause a very slight precipitate, but no more. The bath must then be placed in sunlight for a few hours, which will blacken and precipitate any organic matter present. The bath may then be filtered; and if it be intended for use with positives, have a little nitric acid added; if

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for negatives, it may be either used as it is, or have a few drops of acetic acid added.

Spots and *specks* of all kinds are caused by insoluble particles floating in the collodion, and which become deposited on the plate as the collodion is poured on. The recurrence of these may be prevented by allowing the bottle containing the collodion to remain at rest for some time, and then decanting the clear fluid into a perfectly clean bottle. A tall bottle, like that at Fig. 29, is very useful for this purpose. Spots are often caused by the use of simply iodized collodion too soon after iodizing. The remedy is mixing it with an older sample, or one which contains a little bromide. Another cause is the presence of dust in the operating-room. To obviate this, it is of the utmost importance that dust be excluded as much as possible. The plate should be carefully dusted with a large camel's hair brush the last thing before coating, to ensure freedom from dust on the plate. Spots are sometimes caused from turbidity of the nitrate solution; filtering is then necessary. Rough and imperfect glasses will also cause spots on the picture. The nitrate bath being super-saturated with iodide of silver is a frequent cause of spots or pin-holes. The best remedy is to add an equal bulk of fresh mixed silver solution.

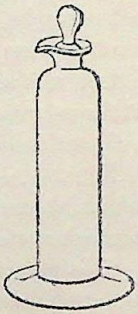

Fig. 29.

Diagonal Lines, or Ridges across the Plate, are caused by the collodion becoming too thick, either from the high temperature of the atmosphere, or from having been used for too many plates. The remedy, in this case, is to add sufficient pure sulphuric ether to reduce the collodion to the proper consistency, the test being, when it flows evenly over the plate, without ridges or lines being formed as the film dries.

Stains may arise from many causes, such as dirty plates; from lifting the plate out of the bath too soon; from making a pause during the first immersion; from not covering the plate with the developing solution at one sweep; from the developing solution not having sufficient alcohol, and so running on the plate in greasy-

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looking lines; from pouring the developing solution too forcibly on one spot; from using dirty dark frames: these should be wiped each time with a piece of cloth, and now and then thoroughly washed; from holding the plate with fingers which have been in recent contact with cyanide of potassium, or hyposulphite of soda; or from using the cyanide of potassium so strong as to attack the picture. Crape-lines or fringes may either arise from inferior collodion; the collodion being used too thick; or from immersing the plate before the film was properly set. Stains of a blue colour will arise from applying the cyanide of potassium to the plate without having sufficiently washed away the iron developer. The collodion being too thick and glutinous will give an uneven film, and cause a mottled and irregular appearance in the picture. The remedy is to dilute the collodion with ether, or with a thinner collodion. Sometimes the positive or negative when dry will appear covered with a network of fine cracks. This is generally the fault of the collodion, but it may be remedied to some extent by allowing the film to set well before immersion in the bath.

Streaks will arise from the use of a bath slightly alkaline—from the use of an old bath which has acquired a large accumulation of ether and alcohol from constant use. From the use of very new collodion, &c. In all these cases the remedy is obvious. Dust on the surface of the bath will give rise to a number of blemishes on the plates, the kind varying with the nature of the deposit; if the bath has been allowed to be exposed to the air and light for some days, the surface will be covered with a thin layer of pure silver, this will cause stains over the plate immersed in a bath so circumstanced, but the most frequent difficulty met with arises from the dust of the room settling on the surface; if a plate be immersed when the surface of the bath is covered with dust, it will be found that, as it descends into it, the particles attach themselves to the surface of the film, and are carried down with the plate; these do not wash off, but adhere firmly, and, on developing a picture taken on a plate prepared in this way, we shall have a series of lines composed of black spots, running from the bottom of the plate to the top, in fact, following the direction of the immersion in the bath.

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This difficulty is obviated by filtering the bath, or by carefully drawing over its surface a piece of perfectly clean bibulous paper; this will remove the particles of dust and the cause of failure at the same time.

Feebleness of the Image. This, in either negative or collodion positives, is most commonly the consequence of over-exposure, in which case the remedy is obvious. It may also be caused by imperfect lighting or general diffused light surrounding the object, which does not give sufficient contrast of light and shadow. Over-development will produce a similar result, or it may be caused by the quality of the collodion causing it to give excess of half-tone and want of contrast; keeping the collodion a short time will often remedy this. Fog, above described, will also cause the image to be feeble and wanting in contrast.

Hardness, or Excess of Contrast. Pictures without half tone, presenting merely a crude mass of black and white, may be caused in several ways. Under-exposure is the most common cause, the light in that case being sufficient to bring out the lights, but not the details in less illuminated parts. The bath being too acid will also cause it; as will also the use of old insensitive collodion. Under-development will produce a similar result.

Imperfect Definition. This may proceed from various causes. The most common is imperfect focussing, or the object or model having moved after the focus was obtained; unsteadiness of the camera or stand, or of the sitter, during the time of exposure. If from none of these causes, it may arise from a bad lens, or from the optical and chemical foci of the lens not being exactly coincident, or from the plate not resting evenly in its place in the frame, or from the plate and the focussing glass not occupying exactly the same position in the camera. The remedy in all these is obvious; in regard to the last-mentioned cause, it is very important to ascertain that the camera is properly adjusted in this respect. If, therefore, after focussing properly, the image is not as sharp in the picture as it was on the ground glass, proceed to examine the camera. Unscrew the lens from the flange, and placing a rule through the aperture, measure accurately from the ground glass to the flange of the lens: now remove the ground glass and put in its place the

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dark slide with a glass plate, and again measure. If the camera be properly adjusted, the distance will be just the same. If there be any difference, the dark slide must be adjusted so that the sensitive plate may occupy precisely the same position as the ground glass.

Solarization is a defect to which negatives are occasionally subject. It consists in the high lights, which should be the densest parts, becoming red and transparent from over action of light. A variety of causes will conduce to this effect in a bright light; but the remedy consists in the use of a sample of *bromo*-iodized collodion, or the use of citric acid in the developing solution.

A variety of other defects may arise from careless and slovenly manipulation, or from dirt and dust being present, from the slides not being clean and dry; from any part of the apparatus getting cracked, twisted, or in any way put out of order, and from a variety of other causes, which the care and judgment of the student must be exercised to detect and avoid.

Imperfections in Paper Prints.

Whatever defects or imperfections may exist in the negative will of course be produced in the paper picture printed from it. Difficulties and imperfections will be found, however, independent of these. We shall briefly point out such as the student will most probably meet with, together with their remedies.

A marbled Appearance in the print will often arise from the silver solution being too weak, or from an insufficient supply in the dish, or from an inferior quality of paper, which imbibes the solution unequally, or from being floated too short a time.

Spots may arise from metallic particles in the paper, some impurity floating on the surface of the nitrate of silver, or from defects in albumenizing the paper.

Bronzing and loss of Details in the Shadows arise from a somewhat under-exposed and over-developed negative. A paper prepared with a weaker nitrate bath is best for such a negative.

The Print tones slowly and imperfectly. Slow and imperfect toning is generally the result of bad paper, or it may be caused by a weak acid nitrate bath, or toning bath being too weak or too alkaline.

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The Print has a faded, feeble Appearance. This most frequently arises from the nitrate solution being weak, as it loses strength by repeated floatings. It may be the result of a weak negative, or bad paper; or it will sometimes arise from over-toning.

Yellowness of the Whites. This may arise from an old exhausted and acid fixing bath being used, or from the print being exposed to the light before fixing; or from the paper having been too long sensitized.

Stains of various kinds will arise from various causes, such as floating scum on the silver bath; splashes of other solutions, especially hypo, coming in contact with the paper; they also will arise from too much fingering of the paper in any part of the manipulation, especially if the hands have touched hypo or other chemicals. The slightest touch or splash of hypo upon an unfixed print makes a brownish stain, with a metallic reflection. Silver touching the fixed but unwashed print has a somewhat similar effect. But one of the most disastrous stains arises from a cause which, without care, the beginner is very liable to meet with; this is imperfect fixation. If the fixing bath of hyposulphite of soda have been used until its fixing powers are exhausted, or if it be too weak, or if the prints are not suffered to remain in the solution a sufficient length of time, the print then becomes imperfectly fixed. To explain the result, it is necessary here to mention that the first result of placing the print containing chloride of silver into the fixing bath of hyposulphite of soda, is to convert the chloride of silver into hyposulphite of silver. If the bath be strong enough to do its work, this hyposulphite of silver is dissolved by the excess of the hyposulphite of soda, hyposulphite of silver being soluble in a strong solution of hyposulphite of soda. If the hyposulphite fixing bath be weak or exhausted, or if the print be removed too soon, the hyposulphite of silver is not dissolved, and being insoluble in water, remains in the print. The worst effect remains to come: this hyposulphite of silver is very unstable, and readily decomposes, especially in the presence of light. Whilst the print is washing, therefore, it usually happens that the hyposulphite of silver, which has been left in the print decomposes, and the print is covered with mottled-brownish or dirty yellow spots, which effectually spoil it.

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Prints Fading. Fading in prints is due to various causes. The cause just described will, if it do not spoil the prints at once, cause them to fade. The use of an acid fixing bath, liberating sulphur, will cause prints to fade. When this cause is present, it may generally be detected by the prints becoming blacker in the fixing bath, the whites at the same time generally assuming a slight tinge of yellow. Imperfect washing after fixing is a fruitful cause of fading. Damp or impure atmosphere will aid fading, as will contact with acids and other chemicals. If prints be produced with every proper precaution, and then kept with reasonable care, they may generally be relied upon as permanent.

PHOTOGRAPHY IN THE TROPICS.

As various causes combine to render necessary modifications in the usual manipulations when photography is practised in tropical latitudes, some pains have been taken to secure as authentic information as possible upon this part of the subject; and the following remarks have been compiled from notes written on the spot, the accuracy of which may be relied upon.

One of the ever-recurring difficulties that the tropical photographer has to contend with, or rather to submit to, for it is evidently without a remedy, is the constant variation in the actinic power of the light, while the apparent illuminating quantity remains unaltered. This frequently changes from hour to hour, and a picture which would be under-exposed at noon with a minute, may be solarized an hour after with an exposure of 30 seconds. This fact militates especially against the operations of the dry-plate photographer, who can only time his exposure by previous trials with apparently similarly lighted subjects. A good precaution against accidents arising from this cause, when working with dry plates, is to proceed with the development with pyrogallic acid solution alone, without any acid or silver. If the exposure has been too long, by pouring it off the plate immediately, washing this latter plentifully with water before the action has proceeded very far, and then using again the same solution corrected with a drop or two of acetic acid,

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the picture may be saved. If, on the contrary, the exposure appears to have been too short, and the picture delayed in making its appearance, heat may be applied in moderation, which will render the effect of the developer more vigorous. By using these means a very great latitude of exposure is possible, and also from the absence of free silver the chances of stains from hot hands are much lessened.

It is a matter of extreme difficulty to compare, with anything like accuracy, the relative average intensity of actinic light in the tropics with that of European countries, as many causes may act in combination to influence the result of direct experiments. For instance, the extreme heat would tend, not only to heighten the chemical action of the various materials employed upon each other, but also to decompose or alter the normal conditions of those delicate compounds in which ether, alcohol, acetic acid, and such organic materials play a principal part. Again, the less favourable angle at which the direct sun's rays fall upon the earth in the tropics would have a retarding influence. Laying aside these disturbing causes, experience seems to show, that a photographic plate requires about the same exposure in the tropics as a similarly lighted view would in Europe during the hot season; but if there be any difference one way or the other, the advantage in the chemical quality of light appears to be on the side of the more northern latitudes.

Inconvenient as this inequality of chemical light must necessarily prove, there are other drawbacks to the successful practice of photography in the tropics, of far more serious nature. These are the heat, the moisture, and, though last, certainly not least, the ravages of insects. The following points may enable the English photographer to achieve a more easy and certain success under the southern cross, should his zeal lead him there, than if only guided by his experience in our temperate climate.

In selecting a camera for the tropics, *strength* should be a main feature. None manufactured for use in this country are sufficiently strong. It must be remembered that weight is no consideration, for whatever the photographer's enthusiasm for his art he will certainly never carry it himself. The deduction may seem wanting

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in charity; but the negro in the west, and the coolies in the east, are at their ease when the thermometer is at 120°, and are accustomed to carry heavy burthens for long distances, while it is simply impossible to the European. But the very necessity one is under to employ these gentry for the purpose, renders it absolutely indispensable to make the cameras and all apparatus entrusted to them of the strongest construction, as they are incorrigibly careless, especially the negro, and one may reckon upon the camera being dropped about as often as it is carried miles.

Thoroughly well-seasoned wood should be used in its construction, and it should be secured with screws, and also be brass bound. The parts which slide within others, such as the inner body and the shutters of the backs, should fit quite easily, so that the swelling caused by the great damp may not make them stick. But more than usual care should be given to the fitting of the shutters, because the sun being in the zenith, is more apt to get in upon the plate. For the same reason also the transversal slit in the lens mount for the Waterhouse stop, which is so generally used in England, is said to be objectionable near the equator.

In place of the leather case, which is usually supplied in Europe as a camera cover, it should, in preference, be fitted into a tin box supplied with a good lock, this will be found useful as a protection against damp, ants or other insects, and peculation.

The damp at night in some intertropical regions, especially near the sea coast, is very great; and proves often a real annoyance to the photographer. Its effect upon the cameras is to unfasten the glue, to swell the wood, and, succeeded by the direct action of the sun, when used in the field, to produce general warping of all the parts.

The ants and other insects are also a great nuisance, especially the white ant. These latter are nowise difficult in their tastes, and few things seem to come amiss to their singular appetites, but hard wood appears to be peculiarly palatable to them, and woe to the camera to which they have an opportunity of paying their addresses. There is also a smaller kind of red ant which is found almost everywhere in incredible numbers, that is very troublesome. It does not eat the wood, but it is so small that it can pass through the

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most minute crevices if an opportunity offers; and as they swarm everywhere, it is often difficult to keep the camera clear of them. The trace of their tiny footsteps may frequently be seen upon the developed plate, over which they have been running during the time of exposure.

With regard to the necessity of guarding against peculation, the failings of the negro generally on this score are too well known to need any argument to enforce it.

It must be borne in mind that, as a general rule, nothing whatever in the shape of photographic apparatus or materials can be procured on the spot, and most frequently even not nearer than Europe, so the tourist must be careful to furnish himself with an ample supply of chemicals of every kind, as well as some duplicates of such parts of his necessary apparatus as are most likely to meet with misfortune, such as glass measures, funnels, baths, and trays. For these latter *pure* gutta-percha is found to stand very well, and may be used with great advantage.

As a general rule, it will be found an advantage in the tropics to render the bath liquid slightly acid with acetic acid, to correct the effect of the heat, and to employ as little silver as possible in the development. Some photographers who have had experience in those latitudes recommend, when working the wet collodion process, that a plate, before exposure, should be treated like a Fothergill plate, and be slightly washed with distilled water, to reduce the amount of free nitrate on the surface. This method is probably better than retarding the development by increasing the dose of acid in the developer, which is apt to produce hard results.

The collodion should be highly bromidized, and should contain a large proportion of alcohol to the ether; as much as five or six parts of the former to one of the latter may be safely used. A collodion so composed will not only be much more easy to spread upon the plate, when the temperature of the air is very high, but the compound itself will be found to have less tendency to spontaneous decomposition from the effects of the climate, than those into which ether enters as a principal ingredient.

As is the case in England, an iron developer is generally recommended for the wet process, and pyrogallic acid for dry

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plates. The strength of the iron developer and the proportion of acetic acid used must clearly depend upon the composition of the collodion, and especially upon the method employed subsequently to intensifying the negative. The small quantity of alcohol that is required with the iron developer should be added only at the moment it is about to be used, as its presence in the solution with the acetic acid hastens its decomposition. For the reasons stated above, a plain solution of pyrogallic acid, without acetic acid or silver, is best for the first development of dry plates. As an aqueous solution of pyrogallic acid, without acetic or citric acid, is rapidly decomposed in hot climates, and becomes useless after being mixed a few hours, it will be found convenient in practice to keep in stock an alcoholic solution of a known strength, of which a certain number of drops are equivalent to one grain, and the proper quantity of this solution can be added to the required volume of water immediately before developing each plate.

It is difficult to affirm in a general manner whether the wet or dry process be the most advantageous for the tropics, as the preference will be decided very much by the exact locality as well as by the particular inclination of the photographer. A slight sketch of some of the more salient points bearing on each, indicating the difference between the practice of the art in those parts and in England, may serve to assist the reader to form his own opinion.

Firstly, the enthusiastic photographer, who is a mere visitor to these sunny realms, must at once give up the idea that he will be able to abandon himself to his favourite pursuit with the same indefatigable zeal and delight which he experiences in this country. When he has lived some time in the country, and has become in some measure inured to the climate, he may, if he has not succumbed to the influence of the example of universal indolence, which is sure to be everywhere present before his eyes, be able to apply himself with vigour and pleasure to his task; but this is seldom the case with new arrivals. Not that these suffer the most from the heat as concerns their general health, on the contrary, the first year in a tropical country is mostly one of extreme enjoyment, when the hitherto unknown charms of luxuriant nature first unfolded to the mind seem to enhance the value of life, and to paint the

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pleasure of existence from a totally new point of view. Still this sensation of well-being evinces itself in a totally different manner to that in which a like feeling would be demonstrated at home, where a buoyant elasticity of the mind is nearly certain to translate itself into a corresponding vigour of the body, and a desire for active motion.

It is pleasant to rise with the dawning day, when the hills are blushing from the first kiss of the yet unseen sun, and, during the few moments when the short-lived twilight, scarce begun yet almost ended, holds its shield of gauze between the night and day, to watch the ruddy gleam steal down towards the valleys, and upwards to the skies, seizing upon each woolly cloud and turning it to fire, until from the horizon to far beyond the zenith the whole firmament is aglow. All living nature wakes and joins in shrill chorus to salute the morning; the flowers and trees raise their heads and shake the bountiful dew from their graceful crests. Suddenly the mountains lose their fairy tracing and assume a rigid form; their golden garments are laid aside for sober gray. The ruby sky passes from red to gold; from gold to white, as a brilliant streak shoots upward from the east, and in a few moments all the gorgeous splendour of colour and form pales before the majesty of the new-born sun. A day has begun.

It is pleasant to make acquaintance for the first time with the splendid verdure, and the dazzling plumage of equatorial lands. The graceful palms; the feathery ferns; the gigantic cacti; the gaudy parrots, and jewelled humming birds, transport the imagination to fairy land.

It is pleasant when the sun is at his noon heat, while all nature is hushed, when the very insects cease their shrill cries and shrink under the drooping leaves, to be stretched in a hammock of grass-wove net, and with gentle oscillating movement fan oneself with the fragrant air.

It is most pleasant when the heat of the day is passed, and the burning sun is replaced by the glorious equinoctial moon, to sit upon the terrace and catch the welcome breeze, while myriads of fire flies dart their sparkling flashes round each bush, and the insect world plies its varied orchestra. The air is laden with the scent of

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spices and sweet blossoms. The lazy fish, skimmering silently upon the pool, raises a phosphorescent wave like liquid fire that outshines the neighbouring moonlit ripple. Everything around seems beautiful, and each sense finds something to rejoice in.

The climate of tropical countries varies as much from geographical causes as that of our temperate latitudes. In some parts the only variation of temperature for months together is from 100°, in the shade, during the day, to 95° during the night. In others, especially in islands, the nights are comparatively cool and tempered by a light breeze; the thermometer descends to 75°, and sometimes even lower. It may well be supposed that with the thermometer at 95° in the evening, the wet process claims the preference, as it postpones the necessity of beginning to work till the morrow. In those places where the temperature is more moderate, dry plates can be prepared without any inconvenience.

In almost all parts near the sea-shore the dews at night are extremely heavy, which, though precious to the vegetable world, are in the highest degree destructive to dry plates. They must be guarded with extraordinary precaution, and should never be placed in the double backs until the morning of the day on which they are going to be exposed. The best way of preserving them is that in which they are packed by Dr. Norris; that is, tied up in dozens, wrapped in gutta-percha, or water-proofed paper, and buried in a boxful of bran. They should not be kept in an ordinary grooved-box, as that admits the damp quite readily. They should be developed as soon as convenient after exposure, and, if possible, this should not be delayed until the next day.

The collodio-albumen process has been very successfully worked by several photographers in the tropics, and it has this great recommendation that the plates can be prepared at home in England with the exception of the last dip in the aceto-nitrate bath, and may be carried about in that state, for any period, in perfect safety. For plates that have to be entirely prepared upon the spot, it is probable that Major Russell's tannin process would be the most suitable, as it is very simple, and good results can generally be relied on. In either case they should not be sensitized till the latest possible moment before they are to be employed, because, though under

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favourable circumstances they *might* keep good for months, they are always in danger from the damp and insects.

A cover consisting of a wooden frame covered with fine gauze, like a meat cover, must generally be used to protect the plates when they are drying spontaneously, both after sensitizing and after development, to keep off the cockroaches, mosquitos, and ants; indeed, in spite of every precaution, these last will frequently manage to get on to the soft films and spoil them.

For large pictures, where the extreme delicacy and sharpness of collodion is not absolutely necessary, the waxed-paper and calotype processes are found very valuable, and possess the valuable quality of packing in a little space, and running no risk from breakage if dropped by careless native servants or negroes.

The necessary handling of dry plates in putting them into the slides, taking them out, and developing them with fingers that are not only hot, but, *honi soit qui mal y pense*, generally in a state of profuse perspiration, inevitably produces stains upon the edges, and for this reason it is very advisable that the front of the slide should be so constructed, as to shield the edges of the plate for about a quarter of an inch all round from the light; because if these stains are not exposed to light, they will not appear under the action of the developer, and the picture will be quite clean notwithstanding.

The wet-plate photographer also has his own little inconveniences to contend with. When the heat of the sun causes the mercury to rise to 120° or more, and when the blood is still further heated by the exercise of walking or riding over the country, it is far from refreshing to crawl into a shifting tent a few feet square with little ventilation; nor is it at all easy to successfully conduct delicate chemical manipulations under such circumstances.

The whole body is generally in an active state of perspiration, and literally steams. The hands when approached to within six inches of the polished glass plate, dim it with the vapour they emit, and contaminate the cloths and everything they touch. The collodion evaporates almost before it can spread upon the glass, and fills the tent with stifling fumes of ether, so that by the time the plate is quite prepared the operator is nearly suffocated.

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The following suggestions will be found of practical use to those who propose working wet collodion in hot countries:—

Select a very large tent, and one, if such can be found, whose design admits of free ventilation.

Take into the field a large stock of well-cleaned glasses which have only to be brushed before being used, as the moisture of the hands will not allow of their being polished on the spot.

Both for pouring on the collodion and for developing, use a pneumatic holder; and use an india-rubber stall on the fore-finger and thumb to place the plate in, and remove it from the bath. These, of course, must be thoroughly washed after each picture.

Provide a large mackintosh bag for water, that the hands may be plentifully washed and cooled as often as necessary.

With these precautions it will be found that, although not quite such a pastime as in England, wet-collodion negatives of the highest class may be obtained with certainty in the hottest climate.

All things considered, it is probable that the wet process will always find the greatest number of followers in the tropics, from the reasons that the preparations are fewer, and that the necessary *impedimenta* being transported by negroes or coolies, give no concern or trouble to the artist himself.

ENGLISH WEIGHTS AND MEASURES.

STANDARD OR SPECIFIC GRAVITY.

The *imperial pound avoirdupois*, which is the standard unit by means of which all heavy goods of large masses are weighed, is *defined* to be the weight of *one-tenth* of an imperial gallon, or of 27·7274 cubic inches of distilled water, ascertained at a time when the barometer stands at 30° and the height of *Fahrenheit's* thermometer is 62°: and this standard may consequently be verified or recovered at any time, when it may be necessary to appeal to experiment.

If the weight of a cubic inch of distilled water be divided into 505 equal parts, and each of such parts be defined to be a *half grain*, it follows that 27·7274 cubic inches contain very nearly 7,000 such grains; and it is hence declared by Act of Parliament that 7,000 *grains* exactly

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shall hereafter be considered as the *pound* avoirdupois: and that 10 *grains* shall be equivalent to 1 *scruple*: and 3 *scruples* to 1 *dram*: but these latter denominations are seldom necessary unless great nicety be required.

This weight receives its name from *avoirs*, the ancient name for *goods* and *chattels*, and *poids* signifying *weight*, in the ordinary language of the country at the time of the *Normans*.

The *Restored Imperial Standard Pound Avoirdupois*, is constructed of Platinum, the form being that of a *cylinder* nearly 1·35 inch in height, and 1·15 inch in diameter, marked P.S., 1844, 1 lb.

AVOIRDUPOIS WEIGHT.

$27\frac{11}{32}$	Grains	...	= 1	Dram	...	= $27\frac{11}{32}$	grs.
16	Drams	...	= 1	Ounce	...	= $437\frac{1}{2}$	,,
16	Ounces	...	= 1	Pound (lb.)		= 7000	,,
14	Pounds	...	= 1	Stone.			
28	Pounds	...	= 1	Quarter (qr.)			
4	Quarters	...	= 1	Hundredweight (cwt.)			
20	Cwt.	...	= 1	Ton.			

TROY WEIGHT.

24	Grains	...	= 1	Pennyweight	=	24	grs.
20	Pennyweights		= 1	Ounce	...	= 480	,,
12	Ounces	...	= 1	Pound	...	= 5760	,,

This weight is applied to gold, silver, jewels, &c., and is generally used in philosophical experiments.

APOTHECARIES' WEIGHT.

						TROY.	
20	Grains	...	= 1	Scruple	...	= 20	grs.
3	Scruples	...	= 1	Drachm	...	= 60	,,
8	Drachms	...	= 1	Ounce	...	= 480	,,
12	Ounces	...	= 1	Pound	...	= 5760	,,

This weight is only established by custom, and not by any Act of Parliament.

Apothecaries compound their medicines by this weight, but buy and sell their drugs by avoirdupois.

APOTHECARIES' FLUID MEASURE.

					MARKED.
60	Minims ♏	... = 1	Fluid Drachm	.....	f ʒ
8	Drachms	... = 1	Ounce	.....	f ℥
20	Ounces	... = 1	Pint	.....	O
8	Pints	... = 1	Gallon	.....	gall.

LONDON: T. PIPER, PRINTER, 32, PATERNOSTER ROW.

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PRICE LIST

AND

ILLUSTRATED CATALOGUE

OF

APPARATUS AND CHEMICAL PREPARATIONS

USED IN THE ART OF

PHOTOGRAPHY;

COMPRISING THE

WET AND DRY COLLODION PROCESSES,

WAXED PAPER, CALOTYPE,

ALBUMEN, AND POSITIVE PAPER PROCESSES.

MANUFACTURED AND SOLD BY

BLAND & CO.,

OPTICIANS AND PHOTOGRAPHIC INSTRUMENT MAKERS

In Ordinary To Her Majesty

BY APPOINTMENT,

153, FLEET STREET, LONDON.

1863.

*** All previous Price Lists by BLAND & CO. are cancelled.

ENTERED AT STATIONERS' HALL.]

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LONDON:
PRINTED BY THOMAS PIPER, 32, PATERNOSTER ROW.

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PREFACE.

MESSRS. BLAND & CO.,

In submitting the following Catalogue of Instruments, Apparatus, and Chemical Preparations used in the beautiful Art of Photography, to the notice of Amateurs and Photographers in general, would take this opportunity of stating, that nearly the whole of the Apparatus therein described is manufactured on the premises, under their own immediate superintendence; thereby insuring instruments with all the most recent improvements, and at very moderate prices.

They would further state that, for the better carrying out of experiments in Photography, and the testing of Photographic Lenses during the manufacture, they have erected a spacious Glass Room, in which every requisite for the illustration of the various processes, and trial of Lenses, will be found.

Purchasers of Apparatus, and others desiring information, will receive every instruction and explanation as to the manipulations and scientific principles involved in the various Photographic processes, either by letter or personally, at the establishment, No. 153, Fleet Street, London.

Orders from abroad, which should be accompanied by an order for payment in London, executed in the best manner and in the shortest possible time.

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Price List

OF

PHOTOGRAPHIC APPARATUS.

Messrs. BLAND & CO. would mention with respect, that it is necessary that all orders be accompanied by a remittance, or order for payment in London, otherwise they cannot be forwarded. Attention to this particular will obviate delay and inconvenience. Bland & Co. suggest that it is desirable when orders are sent from Abroad to them through an Agent, that the climate for which the Instruments are intended should be specified, in order that suitable Apparatus may be ensured, and also that the Agent be definitely instructed to procure the same from

BLAND & CO.,

153, FLEET STREET, LONDON.

International Exhibition, 1862.

No Medals were awarded in this Class for Photographic Apparatus.

Honourable Mention: BLAND and CO.

Award of Jurors: BLAND and CO.;

For very excellent workmanship and arrangements, especially adapted for INDIA and FOREIGN CLIMATES.

"Bland and Co. attest what the English can do as makers of apparatus."—*Times, August 8th*, 1862.

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LENSES.

Single Achromatic Lenses, unmounted, suitable for taking views by Calotype or Collodion processes :—

	Diameter.	Focus.	£	s.	d.
No. 1.	1¼ inches	4 to 6 inches	0	6	0
2.	1⅜ „	6 to 7 „	0	8	0
3.	1¾ „	6 to 8 „	0	10	0
4.	2 „	8 to 10 „	0	14	0
5.	2¼ „	8 to 10 „	0	17	0
6.	2⅝ „	12 to 14 „	1	5	0
7.	3 „	12 to 15 „	1	16	0
8.	3½ „	12 to 16 „	2	10	0
9.	4 „	16 to 20 „	3	10	0
Stereoscopic Lenses—					
No. 10.	1¼ „	4½ & 6 „ each	0	6	0

BLAND & CO.'S ACHROMATIC LANDSCAPE LENSES.

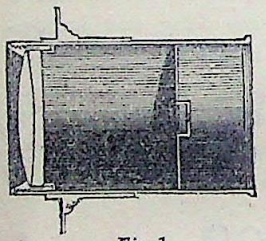

Fig. 1.

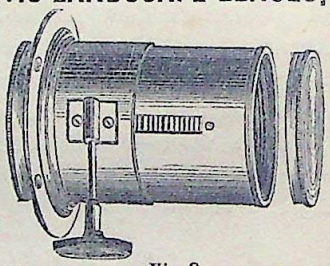

Fig. 2.

Mounted in handsome brass fronts, with rings for adaptation to Camera :—

	Diameter.	Simple sliding Tube (*Fig.* 1). £	s.	d.	For Pictures.	Rack and Pinion (*Fig.* 2) £	s.	d.
No. 1.	1¼ inches	0	16	0	5 in. by 4 in.	1	1	0
2.	1⅜ „	1	1	0		1	6	0
3.	1¾ „	1	5	0	6 „ by 5 „	1	11	6
4.	2 „	1	12	0		2	2	0
5.	2¼ „	1	15	0	7 „ by 6 „	2	7	0
6.	2⅝ „	2	5	0	9 „ by 7 „	2	14	6
7.	3 „	3	15	0	11 „ by 9 „	4	10	0
8.	3½ „	4	12	6	12 „ by 10 „	6	0	0
9.	4 „	6	10	0	15 „ by 12 „	7	7	0

	Diameter.	Stereoscopic sliding Tube.			Rack and Pinion.		
		£	s.	d.	£	s.	d.
No. 10.	1¼ „	0	16	0	1	1	0

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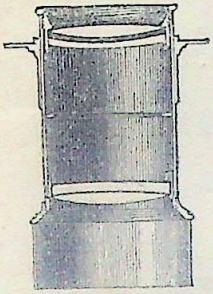


Fig. 3.
Sectional view of Compound Achromatic Lens.

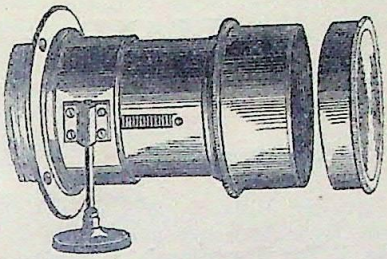


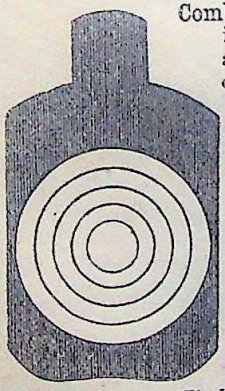
Fig. 4.

BLAND & CO.'S

COMPOUND ACHROMATIC LENSES FOR PORTRAITS,

Fitted with set of Waterhouse's Central Diaphragms. (*Fig.* 5.)

These combinations are particularly recommended for the qualities they possess of giving a flat field, and having their optical and chemical foci coincident, producing an image on the sensitive surface in an extremely short space of time.



Waterhouse's Stops. (*Fig.* 5.)

Combination Achromatic Lenses, mounted in handsome brass front, with rackwork adjustment, and adapted for either portraits or views :—

	£	s.	d.
FOR PICTURES			
No. 1. 4¼ by 3¾ in. (*Fig.* 4.) . .	2	15	0
2. arranged for views, 6 by 5 in. and portraits, 4¼ by 3¼ „	3	0	0
3. 5 by 4 in..	4	4	0
4. arranged for views, 7 by 6 „ and portraits, 5 by 4 „	4	10	0
5. 6 by 5 in..	5	10	0
6. arranged for views, 9 by 7 „ and portraits, 6 by 5 „	6	0	0
7. 8½ by 6½ in.	11	16	0
8. arranged for views, 12 by 10 and portraits, 8½ by 6½ „	12	12	0

The arrangement of the above lenses for views consists in the removal of one lens in the combination, and placing the other in a different position in the sliding tube, with the requisite stops or diaphragms for regulating the amount of light.

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BLAND & CO.'S

COMPOUND ACHROMATIC PORTRAIT LENSES,

For Stereoscopic Portraits or Views, or for Carte de Visite Pictures.

	£	s.	d.
No. 1. **For Stereoscopic Portraits and Views**, or Carte de Visite portraits, singly, fitted with Waterhouse's Central Stops	2	15	0
No. 1 **A.** The above in pairs, with adjusting bar for caps of lenses, warranted of equal foci . .	5	12	6
*** This lens is suitable for taking Carte de Visite pictures in an operating room of ordinary length, say from 12 to 14 feet.			
No. 2. Of larger size, suitable for a room 16 to 18 feet long, singly	4	4	0
No. 2 **A.** The above in pairs, warranted of equal foci, and connecting bar for caps	8	10	0

COMPOUND ACHROMATIC LENSES FOR PORTRAITS,

With Rack and Pinion.

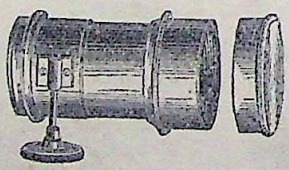

Fig. 6.

	£	s.	d.
No. 1. For pictures, 4¼ by 3¼ inches (*Fig.* 5) .	14s. & 1	1	0
2. „ 6½ by 4¾ „ . . .	£2 & 2	12	6
3. „ 8½ by 6½ „ . . .	£5 & 6	0	0

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BLAND & CO. supply Lenses of all the most eminent British and Foreign manufacturers at the makers' prices, the list of a few of whom are subjoined:—

LIST OF

ROSS'S PHOTOGRAPHIC PORTRAIT LENSES.

The whole of these glasses give fine and correct definition, both at the centre and margin of the picture, and have their visual and chemical acting foci coincident.

	£	s.	d.
No. 1. Portrait lens, consisting of two achromatic combinations, mounted in tubes with rack-and-pinion movement, the lenses 1⅝ inch diameter, and 4½ inches focal length from the back glass, producing pictures on plates 4 by 3 inches and under.	5	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto.	0	15	0
No. 2. Ditto, ditto, the lenses 2¼ inches diameter and 6 focal length, for pictures on plates 5 by 4 inches and under.	8	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto.	1	0	0
No. 2 A. Ditto, ditto, the lenses 2½ inches diameter and 7½ inches focal length, for pictures on plates 5 by 4 inches and under. This lens produces *larger portraits* than the above	10	10	0
A set of Waterhouse's Diaphragms in morocco case, for ditto.	1	5	0
☞ *Either of the above lenses is suitable for "Cartes de Visite" portraits.*			
No. 3. Ditto, ditto, the lenses 3¼ inches diameter and 10 inches focal length, for pictures on plates 6 by 5 inches and under	16	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto.	1	10	0
No. 3 A. Ditto, ditto, the front lens 3¼ inches diameter, the back lens 4 inches diameter, 12 inches focal length, for pictures on plates 8½ by 6½ inches and under.	25	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto.	1	15	0

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ROSS'S LIST (CONTINUED.)

	£	s.	d.
No. 4. Ditto, ditto, the lenses 4½ inches diameter, 15 inches focal length, for pictures on plates 10 by 8 inches and under	36	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto	2	0	0
No. 4A. Ditto, ditto, the front lens 3¾ inches diameter, the back lens 5 inches diameter, 20 inches focal length, for pictures on plates 16 by 14 inches and under	30	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto	2	5	0
A Portrait Lens, 5 inch diameter, 20 inches focal length, for pictures on plates 18 by 16 and under, with set of Waterhouse's Diaphragms in morocco case	42	10	0
A Ditto, ditto, 6 inches diameter, 24 inches focal length, for pictures on plates 22 by 18 and under, with set of Waterhouse's Diaphragms in morocco case	54	0	0
A Portrait lens producing with the whole aperture pictures of a size for Locket plates 1½ by 1 inch, and with the diaphragm 3¼ by 2¾ inches	6	0	0
A set of Waterhouse's Diaphragms in morocco case, for ditto	1	0	0

ROSS'S QUICK-ACTING "CARTES DE VISITE" LENSES.

These Lenses are constructed to give the flattest possible field *consistent with good marginal definition*, and have their chemical and visual foci coincident. They also reproduce the images of objects in their true perspective places.

No. 1. **"Cartes de Visite" lens,** consisting of two actinic combinations, 1¾ inches diameter, 4¼ inches focal length, with rack-and-pinion movement, and Waterhouse's Diaphragms. This lens requires from 13 to 14 feet between the subject and the focusing-screen of Camera	5	15	0
No. 2. Ditto, ditto, 2⅛ inches diameter, 4¾ inches focal length, with rack-and-pinion movement and Waterhouse's Diaphragms. This lens requires from 15 to 16 feet between the subject and the focussing-screen of Camera	6	10	0

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ROSS'S LIST (CONTINUED.)

	£ s. d.
No. 3. Ditto, ditto, 2½ inches diameter 6 inches focal length, with rack-and-pinion movement and Waterhouse's Diaphragms. This lens requires from 19 to 20 feet between the subject and focussing-screen of Camera	11 10 0

The following table, shewing the greatest distance required between the subject and the focussing screen to produce figures 2¾ inches and 3 inches with each of the Lenses (the standard being 6 feet), is given as a guide to Photographers in their selection of a lens suitable for the length of their operating rooms:

	For 2¾ in.	For 3 in.
No. 1 Lens	14 feet	13½ feet.
No. 2 Lens	16 feet	14¾ feet.
No. 3 Lens	20 feet	18¾ feet.

In order that the whole image may be in focus, the Camera should be placed level and midway of the subject, or thereabout; however, some little latitude may be allowed, and the Camera placed somewhat higher, when it will require tilting a little. But if the Camera be put at an elevation of about 5 feet, it must be tilted considerably, and a swing-back to the Camera will be indispensable to get the picture all in focus.

ROSS'S PHOTOGRAPHIC LANDSCAPE LENSES.

No. 1 A. **Landscape lens**, consisting of one achromatic combination, mounted in tubes, with rack-and-pinion movement, the lens 2 inches in diameter and 9 inches focal length, for producing pictures 6 by 5 inches	4 0 0
No. 1. Ditto, ditto, without rack-and-pinion movement.	3 0 0
No. 2. Ditto, ditto, 2½ inches diameter, 12 inches focal length, for pictures 8½ by 6½ inches . . .	5 10 0
No. 2. Ditto, ditto, without rack-and-pinion movement.	4 10 0
No. 3. Ditto, ditto, 3 inches diameter, 15 inches focal length, for pictures 10 by 8 inches . . .	6 10 0
No. 3. Ditto, without rack-and-pinion movement . .	5 10 0
No. 3 A. A ditto, ditto, 3½ inches diameter and 18 inches focal length, for pictures 12 by 10 inches . .	8 0 0
No. 3 A. A ditto without rack-and-pinion movement .	7 0 0

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ROSS'S LIST (CONTINUED.)

		£	s.	d.
No. 4.	Ditto, ditto, 4 inches diameter, 20 inches focal length, for pictures 15 by 12 inches. In consequence of the length of the Camera, this requires an universal joint handle to rack-and-pinion movement	12	0	0
No. 4.	Ditto, ditto, without rack-and-pinion movement	10	0	0
No. 5.	Ditto, ditto, 5 inches diameter, 25 inches focal length, for pictures 18 by 16 inches, without rack-and-pinion movement.	14	0	0
No. 6.	Ditto, ditto, 6 inches diameter, 30 inches focal length, for pictures 22 by 20 inches . . .	22	0	0
No. 7.	Ditto, ditto, 7 inches diameter, 35 inches focal length, for pictures 24 by 22 inches . . .	28	0	0
No. 8.	Ditto, ditto, 8 inches diameter, 40 inches focal length, for pictures 26 by 24 inches . . .	32	0	0

ROSS'S STEREOGRAPHIC LENSES.

A Stereographic Double Lens for Portraits, Groups, Views, and Interiors, Diameter of front combination $1\frac{3}{16}$ inch, of back ditto $1\frac{7}{16}$ inch, $3\frac{1}{4}$ inches focal length. This lens has a rack-and-pinion movement, a set of Waterhouse's Diaphragms. and works INSTANTANEOUSLY .	4	0	0
Ditto, ditto, without rack-and-pinion	3	8	0
An extra back combination can be supplied to the above for producing small "Cartes de Visite" pictures	1	2	6
A Stereographic Single Lens for Views, &c., $4\frac{1}{2}$ inches focal length, 1 inch diameter	1	8	0
Ditto, ditto, ditto, with rack-and-pinion. . . .	2	0	0
A ditto, ditto, 6 inches focal length, $1\frac{3}{10}$ inch diameter .	1	8	0
Ditto, ditto, ditto, with rack-and-pinion . . .	2	0	0
A pair of ditto, ditto, of either $4\frac{1}{2}$ or 6 inches focal length, with combined rack motion and connecting bars to caps	4	5	0

*** Larger and smaller Photographic combinations to order.

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ROSS'S ORTHOGRAPHIC LENSES,

With complete set of Waterhouse's Diaphragms,

FOR

GROUPS, LANDSCAPES, AND ARCHITECTURAL SUBJECTS.

The interiors exhibited by Mr. Bedford, *which have been so highly eulogised by the* Times *and other leading Journals, were taken by the Orthographic Lens, with the whole aperture, on plates of the full dimensions which this Lens is advertised to cover.*

Size of Picture.	Size of Group.	Diameter of Front Lens.	Back Focus.	PRICE. Rigid Setting.	Sliding Tube Adjustment.	Sliding Tube with Rack and Pinion.
in. in.	in. in.	in.	in.	£ s. d.	£ s. d.	£ s. d.
6 × 5	4 × 3	$\frac{9}{10}$	8	3 15 0	4 5 6	4 17 6
$8\frac{1}{2}$ × $6\frac{1}{2}$	6 × 5	$1\frac{1}{8}$	$10\frac{1}{2}$	4 12 6	5 4 6	6 0 0
10 × 8	$7\frac{1}{2}$ × $5\frac{1}{2}$	$1\frac{1}{2}$	14	5 15 5	6 10 0	7 10 0
12 × 10	$8\frac{1}{2}$ × $6\frac{1}{2}$	$1\frac{5}{16}$	$16\frac{1}{2}$	7 0 0	7 18 6	8 18 0*
15 × 12	10 × 8	$2\frac{1}{4}$	$19\frac{1}{2}$	8 0 0	9 5 0	10 5 0
18 × 16	12 × 10	3	26	12 12 0		
22 × 20	15 × 12	$3\frac{5}{16}$	$31\frac{1}{2}$	17 0 0		
25 × 21	18 × 16	4	34	21 0 0		

* Hook's universal joint handle, for 12 × 10 and 15 × 12 lenses, price £1 0 0.

SUTTON'S PATENT PANORAMIC LANDSCAPE LENSES AND CAMERAS,

(*Fig.* 7)

	£ s. d
Lens Camera, with screw adjustment, plate-holder and focussing-screen, water-tight gutta-percha bath, dipper, frame for holding plates while cleaning, box for one dozen curved plates, printing press and tripod stand, in varnished pine case, for pictures on plates $10\frac{1}{2}$ by 5 inches (see page 15)	22 0 0

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	£	s.	d.
Ditto, ditto, for pictures 14 by 6½ inches . . .	30	0	0
Ditto, ditto, „ 17 by 8 „ . . .	40	0	0
Ditto, ditto, „ 20 by 10 „ . . .	60	0	0

These Lenses include an angle of 100 degrees, or about three times the usual amount of subject,

Water-tight Porcelain Baths, in Mahogany cases, may be had for above.

ROSS'S NEW ACTINIC TRIPLETS,

For Architectural Subjects, Copying, and Landscapes.

These Lenses produce undistorted images, and have the central and marginal pencils most carefully corrected.

Photographers will find these Lenses invaluable for copying maps, charts, prints, architectural and other subjects, where straightness of marginal lines is imperative.

The Combination is so constructed that GROUPS may be taken with the *whole aperture* on a plate the next size smaller than that tabulated below.

The diaphragms are arranged in a closer series than has hitherto been the case, so that the time of exposure is more under the command of the operator; thus, with each diaphragm the exposure is to be half as long again as with the diaphragm of the next larger size.

The prices quoted below are for Triplets in sliding tubes, with complete set of Waterhouse's Diaphragms. For rack-and-pinion movement to Triplets from 6 by 5 to 15 by 12, inclusive, 15s. additional will be charged; larger sizes, £1. Hook's joint handle, £1.

Size of Plates.	Back Focus.	Price.
6 by 5 and 7¼ by 4½	7	£4 0 0
8 by 4½	8	4 5 0
8½ by 6½	10	5 0 0
10 by 8 and 11 by 9	12½	7 0 0
12 by 10	15	8 10 0
15 by 12	18	10 10 0
18 by 16	22	12 10 0
22 by 20	28	16 0 0
25 by 21	30	20 0 0
30 by 24	34	25 0 0

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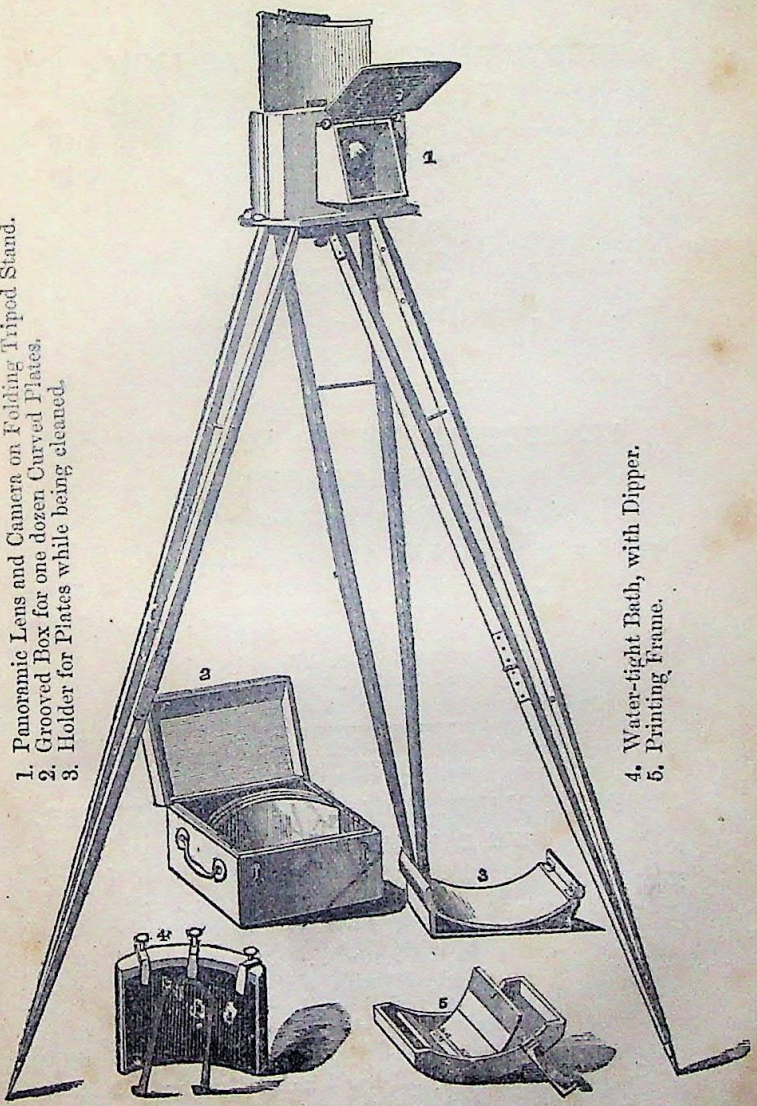
1. Panoramic Lens and Camera on Folding Tripod Stand.
2. Grooved Box for one dozen Curved Plates.
3. Holder for Plates while being cleaned.



4. Water-tight Bath, with Dipper.
5. Printing Frame.

Fig. 7.

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LIST OF

LEREBOUR'S COMPOUND ACHROMATIC PORTRAIT LENSES.

		£	s.	d.
No. 1.	For portraits, $3\frac{1}{4}$ by $2\frac{3}{4}$ inches . . .	1	10	0
2.	„ $4\frac{1}{4}$ by $3\frac{1}{4}$ „	2	10	0
3.	„ $6\frac{1}{2}$ by $4\frac{3}{4}$ „	4	0	0
4.	„ $8\frac{1}{2}$ by $6\frac{1}{2}$ „	9	0	0
5.	„ $8\frac{1}{2}$ by $6\frac{1}{2}$ „ extra quick, diameter of lenses, $3\frac{1}{2}$ inches . .	15	0	0
6.	„ 10 by 8 in., diameter of lenses, 4 inches	25	0	0

LEREBOUR'S SINGLE ACHROMATIC VIEW LENSES,

With Sliding Tube Adjustment.

		£	s.	d.
No. 1.	For landscapes, 5 by 4 inches . . .	1	5	0
2.	„ 7 by 6 „	1	15	0
3.	„ 9 by 7 „	3	10	0
4.	„ 11 by 9 „	6	0	0
5.	„ 12 by 10 „	9	0	0

LIST OF

JAMIN'S COMPOUND ACHROMATIC LENSES,

With Rack-and-Pinion Adjustment.

		£	s.	d.
No. 1.	For portraits, $4\frac{1}{4}$ by $3\frac{1}{4}$ inches	1	5	0
2.	„ $6\frac{1}{2}$ by $4\frac{3}{4}$ „	4	4	0
3.	„ $8\frac{1}{2}$ by $6\frac{1}{2}$ „	7	0	0
4.	„ 10 by 8, with centralizing cone and focal variations of coincidence for portrait and landscape, lenses 4 inches diameter, with 2 sets of racks and pinions	25	0	0
5.	„ 14 by 12, lens 5 inches diameter .	37	10	0

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REDUCED PRICE LIST

OF THE

NEW PHOTOGRAPHIC LENSES

FOR PORTRAITS AND VIEWS,

WITH

COINCIDENCE OF THE VISUAL AND CHEMICAL FOCI,

MANUFACTURED BY

VOIGTLÄNDER & SON,

VIENNA AND BRUNSWICK.

		£	s.	d.
No. A.	Consists of a combination of Achromatic Lenses $1\frac{3}{16}$ in. and $1\frac{3}{8}$ in. diameter, the combined focus being, with regard to the size of the picture, the same as a simple Achromatic Lens of $6\frac{3}{4}$ in. focus, in brass mounting, with central stops, and rack-and-pinion adjustment, adapted for taking pictures on $4\frac{1}{16}$ in. plates . . .	7	2	6
No. B.	Consists of a combination of Achromatic Lenses $2\frac{1}{8}$ in. and $2\frac{3}{16}$ in. diameter, the combined focus being $6\frac{5}{8}$ in., in brass mounting, with central stops, and rack-and-pinion adjustment, suited for taking pictures on $4\frac{1}{16}$ in. plates. This combination commands great power of light. It is a very quick acting instrument, and is particularly adapted for taking portraits of Children.	8	17	6
No. C.	Consists of a combination of Achromatic Lenses $2\frac{9}{16}$ in. and $2\frac{5}{8}$ in. diameter, the combined focus being $9\frac{3}{8}$ in., brass mounting, with central stops, and rack-and-pinion adjustment, adapted for taking pictures up to $7\frac{1}{4}$ in.	12	0	0

The Lenses marked **A. B. C.** are specially constructed for taking "**Carte de Visite**" pictures, and will be found to answer better for that purpose than any hitherto in use. These Lenses will of course take portraits as well.

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VOIGTLANDERS' LIST (CONTINUED.)

		£	s.	d.
	Nos. A. and B. will take perfect pictures of the "Carte de Visite" size in a glasshouse of 17 feet. Specimens (to be returned) will be forwarded on application. Any of the above Lenses may be had in sets of two, four, or six, all of exactly the same foci.			
No. 1.	Consists of a combination of Achromatic Lenses $1\frac{3}{16}$ in. and $1\frac{5}{8}$ in. diameter, the combined focus being $5\frac{3}{4}$ in., in brass mounting, with rack-and-pinion adjustment, adapted for taking pictures on $\frac{1}{8}$ in. and $\frac{1}{4}$ in. plates, or up to $4\frac{1}{4}$ in. by $3\frac{1}{4}$ in.	4	15	0
No. 1a.	The above, with central stops . . . . These Lenses can be had in pairs of precisely the same focal length for taking Stereoscopic Portraits and groups of figures from life, and are the best that can be obtained for that purpose.	5	10	0
No. 2.	Consists of a combination of Achromatic Lenses, $2\frac{1}{8}$ in. and $2\frac{3}{16}$ in. diameter, the combined focus being $7\frac{1}{2}$ in., in brass mounting, with rack-and-pinion adjustment, suited for taking pictures on $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ in. plates, or up to $6\frac{1}{2}$ in. by $4\frac{3}{4}$ in. .	7	7	6
No. 2a.	The above, with central stops . . . . This Lens takes very beautiful "Carte de Visite" portraits, but it requires a glasshouse 21 feet long.	8	2	6
No. 3.	Consists of a combination of Achromatic Lenses, $3\frac{1}{8}$ in. and $3\frac{3}{16}$ in. diameter, the combined focus being $11\frac{1}{2}$ in., brass mounting, with rack-and-pinion adjustment, adapted for taking pictures 8 in. by 6 in. This is the most useful Lens that a photographer, whether amateur or artist, can possess	14	0	0
No. 3a.	The above, with central stops	15	0	0
No. 4a.	Consists of a combination of Achromatic Lenses, $3\frac{1}{8}$ in. and $3\frac{3}{16}$ in. diameter, the combined focus being $8\frac{7}{16}$ in., in brass mounting, with rack-and-pinion adjustment, and central stops, suited for pictures up to $6\frac{1}{2}$ in. by $4\frac{3}{4}$ in. This combination commands an immense power of light, and works in a third less time than Nos. 1, 2, 3 . .	22	0	0

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VOIGTLÄNDER'S LIST (CONTINUED.)

		£	s.	d.
No. 5a.	Consists of a combination of Achromatic Lenses of the respective diameters of $3\frac{1}{8}$ in. and $2\frac{9}{16}$ in., the combined focus being $2\frac{5}{16}$ in., in brass mounting, with rack-and-pinion adjustment, and central stops, suited for taking pictures up to $3\frac{1}{4}$ in. by $2\frac{3}{4}$ in. This short focus, combined with the large aperture, enables it to command an intensity of light four times greater than any other. It is admirably adapted for taking portraits in private rooms not generally suited for the purpose, as also portraits of children. Good pictures can be taken with it in very dull weather	22	0	0
No. 6.	Consists of a combination of Achromatic Lenses of the respective diameters of $4\frac{3}{16}$ in. and $4\frac{1}{4}$ in., the combined focus being $14\frac{5}{8}$ in., in brass mounting, with central stops, suited for taking portraits and pictures from life, on plates of 12 in.	33	0	0
No. 7.	Consists of a combination of Achromatic Lenses of the same diameter as No. 6, and mounted in a similar manner, but the combined focus of the Lenses being longer, viz., equal in effect to a single lens of $18\frac{3}{8}$ in., is suited for taking portraits on $13\frac{1}{2}$ in. plates	33	0	0
No. 8.	Consists of a combination of Achromatic Lenses of the respective diameters of $5\frac{1}{4}$ in. and $5\frac{7}{16}$ in., mounted in brass. The combined focus is equal to a single lens of $22\frac{5}{8}$ in.; it will, therefore, take portraits on plates of 16 in. For small portraits this Lens can be used with its full aperture; but for larger ones or for groups, it is advisable to employ one or other of the stops .	62	0	0
No. 9.	This new combination consists of an arrangement of Achromatic Lenses of $6\frac{3}{8}$ in. and $6\frac{5}{8}$ in. diameter, the combined focus being 27 in. in brass mounting, with central stops, adapted for taking pictures on $19\frac{1}{2}$ in. plates	87	10	0

LENSES OF THE LATEST CONSTRUCTION OF LONG FOCI.

No. 10.	Consists of a combination of Achromatic Lenses of $3\frac{1}{8}$ in. and $3\frac{3}{16}$ in. diameter, the combined focus being $14\frac{3}{8}$ in. in brass mounting, without rack and pinion, and without central stops, adapted for taking pictures on 12 in. plates . . .	11	0	0

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VOIGTLÄNDER'S LIST (CONTINUED.)

	£	s.	d.
No. 11. Consists of a combination of Achromatic Lenses of $4\frac{3}{16}$ in. and $4\frac{1}{4}$ in. diameter, the combined focus being $22\frac{5}{8}$ in. in brass mounting, without rack and pinion, and without central stops, adapted for taking pictures on 16 in. plates . . .	27	10	0
No. 12. Consists of a combination of Achromatic Lenses of $5\frac{1}{4}$ in. and $5\frac{7}{16}$ in. diameter, the combined focus being 27 in., in brass mounting, without rack and pinion, and without central stops, adapted for taking pictures on $19\frac{1}{2}$ in. plates .	50	0	0
No. 13. Consists of a combination of Achromatic Lenses of $6\frac{3}{8}$ and $6\frac{5}{8}$ in. diameter, the combined focus being 35 in., in brass mounting, without rack and pinion, and without central stops, adapted for taking pictures on $23\frac{3}{4}$ in. plates. . .	67	10	0

*** The focus given in all the above Lenses must be understood as measuring from the centre of the combination.

A separate mounting can be furnished for using the front Lens of any of the portrait combinations, for taking views and objects of still-life, though the Orthoscopic Lenses are very much better for the purpose.

The attention of Photographers is directed to the following Observations, which may serve to Guide them in the selection of Portrait Lenses:—

Voigtländer & Son's Lenses, Nos. 1 to 6 inclusive, as well as Nos. A. B. and C. have much more light, on account of their short foci, than common Lenses of the same diameters, and for this reason do not produce as large pictures. This apparent disadvantage will, however, to the greater part be remedied by the application of central stops, by which at a proportionately small loss of light, a larger picture, and greater depth is obtained.

All acquainted with the subject know, that the greatest difficulty in constructing a Lens, is to obtain a large, flat, and well-lighted picture, and it is this latter quality which the Lenses of Voigtländer and Son are known to possess to so great an extent, that is most appreciated by thoroughly practical Photographers.

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To meet the wishes of those, however, who desire large pictures, Voigtländer & Son have constructed a new series of Lenses of long foci, Nos. 10, 11, 12, and 13. The foci of these Lenses being longer than the others of the same diameter, *a larger picture* and *greater depth* is obtained, certainly at some sacrifice of light, but yet these Lenses will be found to possess more light and greater sharpness of definition, than any other Lenses of the same diameter and foci.

The Lenses with long foci being much more easily constructed than the ordinary kind, are offered at a very much reduced price, to which the notice of Photographers is particularly called.

The relative power of light of Voigtländer's Lenses may be stated thus, Nos. A. C. 1, 2, 3, and 6, have the same amount of so-called normal light; Nos. B. and 4 have one-third more; No. 5, four times the amount; Nos. 7 and 8, one-third less; and Nos. 10, 11, 12, and 13, about one-half.

THE

ORTHOSCOPIC PHOTOGRAPHIC LENSES

FOR VIEWS, ETC.

These newly constructed Photographic Lenses, to which Voigtländer and Son have given the name Orthoscopic (correct showing), are especially intended for taking views, copying maps, plans, pictures, and works of art, and all other inanimate objects. With a good light and sensitive chemicals, Portraits may be taken; but this is not the purpose for which the Orthoscopic Lenses are intended.

This new combination consists, like the Portrait Lenses, of two Achromatics, but it differs from them in this particular, that both the Lenses are not Collecting Lenses, but the back or smaller one is a Dispersing Lens. The great advantages gained by this improvement over the simple Achromatic Lenses hitherto employed for taking inanimate objects, views, &c., are the larger field, the increased amount of light, better perspective in the picture, and a greater degree of sharpness of the various objects placed at different distances.

The putting together and mounting of the Lenses is similar to the portrait combinations, but without any rack and pinion. The aperture of the front Lens is never stopped, as is the case with the usual View Lenses, but left perfectly open. The small back Lens is provided with stops of four different apertures, increasing more or less the sharpness of the picture at the sacrifice of light, consequently increasing the time of exposure.

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SIZES AND PRICES OF THE ORTHOSCOPIC VIEW LENSES.

No.	Front Lens.	Focus.	Size of Picture.	Price Complete.	Price without Front Lens.
				£ s. d.	£ s. d.
1	$1\frac{9}{16}$ in.	$11\frac{1}{2}$ in.	10 × 8	4 5 0	2 17 6
2	$2\frac{1}{8}$ in.	15 in.	15 × 11	6 5 0	3 15 0
3	$3\frac{1}{8}$ in.	24 in.	21 × 15	11 0 0	6 10 0
4	$4\frac{3}{16}$ in.	$32\frac{1}{2}$ in.	26 × 21	20 10 0	9 5 0
5	$4\frac{7}{16}$ in.	40 in.	33 × 26	20 10 0	9 5 0
6	$5\frac{1}{4}$ in.	50 in.	42 × 33	31 10 0	13 0 0

£ s. d.

Orthoscopic Lenses, constructed expressly for taking Stereographs, combined focus $4\frac{1}{2}$ in. with two Achromatics of $\frac{5}{8}$ and $\frac{13}{32}$ in.. ; mounted in such a manner that, when used in pairs for one and the same Camera and focussing screen, they may be adjusted to coincide perfectly 3 7 6

These new Lenses are made of six different sizes,—the front Lens corresponding with the front Lens of the following Portrait combinations :—No. 1, $1\frac{9}{16}$ in. diameter ; No. 2, $2\frac{1}{8}$; No. 3, $3\frac{1}{8}$; No. 6, $4\frac{3}{16}$; No. 7, $4\frac{3}{16}$, long focus ; No. 8, $5\frac{1}{4}$. The screws also agree. By this arrangement, those parties possessing either of the portrait combinations can be supplied with the brass mounting and small back Lens, only using their own front Lens, and thereby saving a very considerable cost.

OBSERVATIONS.

The two glasses of the back Lens are not fixed in the mounting, in order to be able to clean them when necessary ; but great care must be taken to replace them in their respective positions. The double concave Lens, with its flatter side downwards, first, then the concave convex Lens, the concave side down ; the ring must not be screwed down too tight.

To focus with these Lenses when there is a want of light, it should be done with the full aperture ; then the focussing screen of the Camera is lifted up, and the cap with an appropriate stop, is pushed on to the mount of the back Lens.

With regard to the size of the pictures as stated in the foregoing List of Prices, it must be understood that the smaller sizes can be obtained for objects very near, for instance, when copying prints, &c., whilst for views it will be possible to get the larger sized picture.

As each Lens is examined and tested under the personal superintendence of Messrs. Voigtländer & Son, just previous to the instruments being packed for this country, the possibility of any (however slightly) imperfect Lenses being received is quite precluded.

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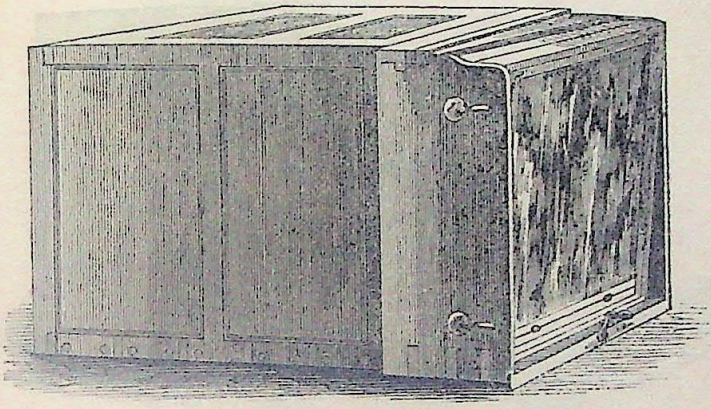

Fig. 8.

TRUNK CAMERA FOR OPERATING ROOM.

Fig. 8.

Best Spanish mahogany or teak wood French-polished rigid square trunk Camera, with long-screw adjustment, enabling the operator to use lenses of different focal lengths; and for copying, with swinging back, for bringing objects at various distances into correct focus. 1 Single back, inner loose frames, and focussing screen.

		Plain.	Framed and Panelled. Extra.	Brass Bound. Extra.
		£ s. d.	£ s. d.	£ s. d.
No. 1. for plates	8½ by 6½	11 0 0	3 3 0	1 10 0
No. 2. „	11 by 9	12 10 0	3 13 6	1 15 0
No. 3. „	12 by 10	14 10 0	4 4 0	2 0 0
No. 4. „	14 by 12	17 10 0	6 6 0	2 10 0
No. 5. „	18 by 16	25 10 0	8 8 0	3 10 0

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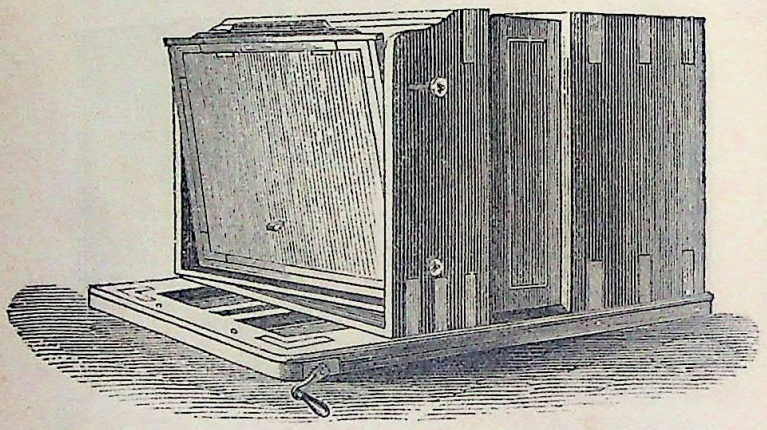

Fig, 9.

SLIDING BODY OR EXPANDING CAMERA FOR OPERATING ROOM.

Fig. 9.

Best Spanish mahogany or teak wood, French-polished, square, sliding body Camera, with inner body panelled, and screw adjustment working from side of Camera. Swing back, rising front. 1 single back, 3 inner loose frames, and focussing screen.

	Plain.			Brass Binding. Extra.		
	£	*s.*	*d.*	£	*s.*	*d.*
No. 1. for plates 8½ by 6½ .	11	10	0 .	1	8	6
No. 2. „ 10 by 8	13	10	0 .	2	0	0
No. 3. „ 11 by 9	15	0	0 .	2	7	6
No. 4. „ 12 by 10	17	10	0 .	3	0	0
No. 5. „ 15 by 12	21	0	0 .	3	10	0

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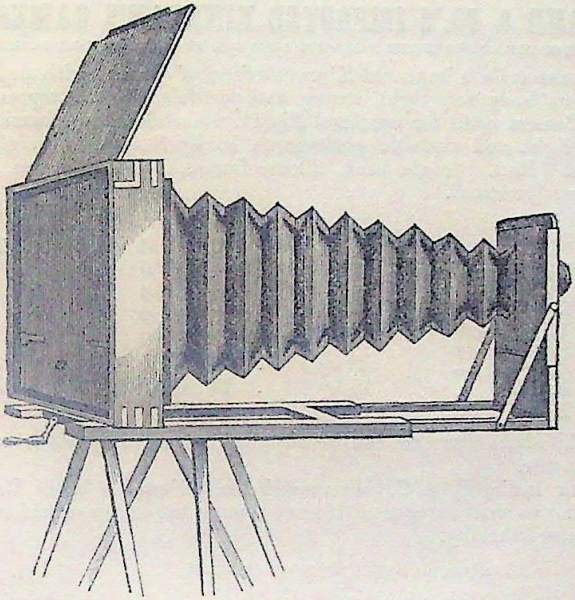

Fig. 10.

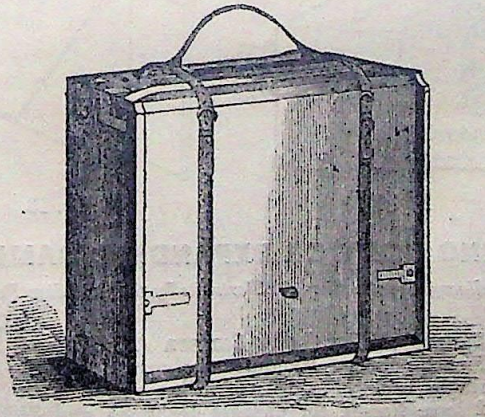

Fig. 11.

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BLAND & CO.'S IMPROVED KINNEAR'S CAMERA.

ANY OF THE LENSES IN THE FOREGOING LISTS CAN BE ADDED TO THIS CAMERA.

BLAND & Co.'s improved Kinnear's form of Camera with conical bellows' body, very light, strong, and portable, *Fig.* 10, represents the Camera open for use; and *Fig* 11, when closed up, forming a very light and portable package (a 10 by 8 Camera, weighiug about 7 lbs.). Single back, 2 loose frames, focussing screen, and screw adjustment.

		Plain.			Brass Binding. Extra.		
		£	s.	d.	£	s.	d.
No. 1. for plates	7 by 6 .	4	15	0 .	0	15	0
No. 2. „	9 by 7 .	5	10	0 .	1	0	0
No. 3. „	10 by 8 .	6	10	0 .	1	2	6
No. 4. „	11 by 9 .	7	7	0 .	1	7	6
No. 5. „	12 by 10 .	8	15	0 .	1	10	0
No. 6. „	15 by 12 .	10	0	0 .	1	15	0
No. 7. „	18 by 16 .	16	0	0 .	2	5	0

The above Cameras can be supplied with swing backs at an extra rate.

For India, B. & C. recommend the bellows to be of Russia leather to resist ravages of insects, though the cost is considerably increased thereby.

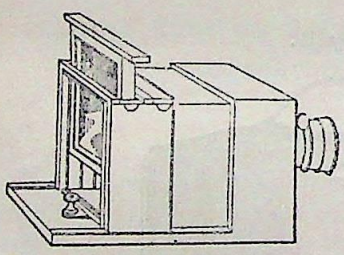

Fig. 12.

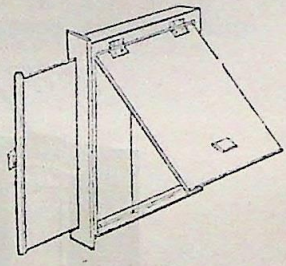

Fig. 13.

SLIDING BODY OR EXPANDING CAMERAS,

Of ordinary Construction, for Portraits by the Collodion Process.

		£	s.	d.
No. 1.	**Square sliding body Camera** (*Fig.* 12), of French-polished Honduras mahogany, with 1 single back (*Fig.* 13), 5 inches square, with 2 loose frames, for pictures 4¼ by 3¼, and 3¼ by 2¾, and focussing screen	1	5	0

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	£	s.	d.
No. 1A. Ditto, ditto, ditto of best Spanish mahogany, with rising front of superior make . . .	1	14	0
Brass binding above Cameras	0	15	0
BLAND & Co.'s compound achromatic lens, No. 1, page 7, with Waterhouse's stops, for above Cameras	2	15	0
French lens of best kind	1	1	0
No. 2. **Square sliding body Camera,** of best French-polished Honduras mahogany, with 1 single back 6 inches square, and 2 loose frames, for plates 5 by 4, and 4¼ by 3¼, with ground focussing screen	1	11	0
No. 2A. Ditto, ditto, ditto, of best Spanish mahogany, with rising front, of superior make . . .	2	8	0
Brass binding above Cameras	0	17	6
BLAND & Co.'s compound achromatic lens, No. 3, page 7, fitted with Waterhouse's stops, for the above	4	4	0
French lens of best kind	2	0	0
No. 3. **Square sliding body Camera,** best French-polished Honduras mahogany, with 1 single back 8 inches square, and 2 loose frames, for plates 6 by 5, and 5 by 4, and focussing screen	2	5	0
No. 3A. Ditto, ditto, ditto, of best Spanish mahogany, and rising front, of superior make . . .	3	10	0
Brass binding above Cameras	1	0	0
BLAND & Co.'s compound achromatic lens, No. 5, page 7, fitted with Waterhouse's stops, for the above	5	10	0
French lens of best kind	2	10	0
No. 4. **Square sliding body Camera,** of best French-polished Honduras mahogany, with 1 single back 10 inches square, and 3 loose frames, for plates, 8½ by 6½, 6 by 5, and 5 by 4, and focussing glass	3	15	0
No. 4A. Ditto, ditto, ditto, of best Spanish mahogany, with rising front of superior make . . .	5	15	0
Brass binding above Cameras	1	10	0

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	£	s.	d.
BLAND & Co.'s compound achromatic lens, No. 7, page 7, fitted with Waterhouse's stops, for the above	11	16	0
French lens of best construction . . .	6	0	0
No. 5. **Square sliding body Camera,** of best French-polished Honduras mahogany, with 1 single back 14 inches square, 3 loose frames, for plates 12 by 10, 10 by 8, and 8½ by 6½, and focussing glass	7	0	0
No. 5A. Ditto, ditto, ditto, of best Spanish mahogany, with rising front, and of superior make . .	10	0	0
Brass binding above Cameras	2	5	0
No. 6. **Square sliding body Camera,** of best French-polished Honduras Mahogany, with 1 single back 18 inches square, 3 loose frames, for plates, 16 by 14, 14 by 12, and 12 by 10, and focussing glass	12	0	0
No. 6A. Ditto, ditto, ditto, of best Spanish mahogany, with rising front, and of superior make . .	17	10	0
Brass binding above Cameras	3	0	0

*** BLAND & Co. supply lenses to above Cameras of any other makers, as may be ordered.

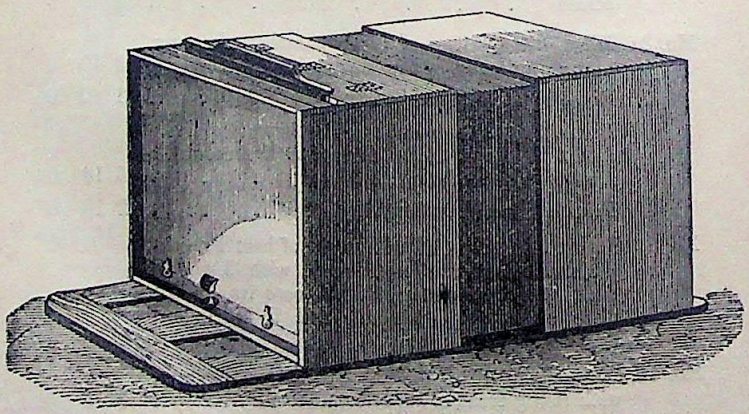

Fig. 14.

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SLIDING BODY OR EXPANDING CAMERAS,

Adapted for Portraits and Views by the Collodion, Calotype, or Waxed Paper Processes. (*Fig.* 14.)

		£	s.	d.
No. 1.	**Sliding body Camera,** of French-polished Honduras mahogany, with 2 single (*Fig.* 13) dark slides, for plates, or paper for portraits 4¼ by 3¼, and views 6 by 5, and focussing glass . .	2	6	0
No. 1A.	Ditto, ditto, ditto, of best Spanish mahogany, with rising front, and superior make . .	3	0	0
	Brass binding above Cameras	0	16	6
	BLAND & Co.'s best compound achromatic lens, of best construction, with Waterhouse's stops (No. 2, page 7), adapted for either portraits 4¼ by 3¼, or views 6 by 5 inches . . .	3	0	0
No. 2.	**Sliding body Camera,** of best French-polished Honduras mahogany, with 2 single backs, for glass plates, or paper, and focussing glass for portraits 5 by 4, or views 7 by 6 . . .	2	16	0
No. 2A.	Ditto, ditto, ditto, of best Spanish mahogany, with rising front, and superior make . .	3	15	0
	Brass binding above-sized Cameras . . .	1	0	0
	BLAND & Co.'s compound achromatic lens, of best construction (No. 4, page 7), fitted with Waterhouse's stops, for portraits 5 by 4, or views 7 by 6	4	10	0
No. 3.	**Sliding body Camera,** of best French-polished Honduras mahogany, with 2 single backs, for glass plates, or paper, and focussing glass for portraits 6 by 5, or views 9 by 7	3	10	0
No. 3A.	Ditto, ditto, ditto, of best Spanish mahogany, with rising front, and superior make . .	4	15	0
	Brass binding above-sized Cameras . . .	1	5	0
	BLAND & Co.'s compound achromatic lens, of the best construction (No. 6, page 7), fitted with Waterhouse's central stops, for portraits 6 by 5, and views 9 by 7	6	0	0
No. 4.	**Sliding body Camera,** of best Honduras mahogany, French-polished, with 2 single backs, for glass plates, or paper, and focussing glass for portraits 8½ by 6½ inches, and views 11 by 9 inches	5	0	0

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	£	s.	d.
No. 4A. Ditto, ditto, ditto, of best Spanish mahogany, French-polished, and with rising front, and of superior make	7	7	0
Brass binding above-sized Cameras	2	0	0
BLAND & Co.'s compound achromatic lens (No. 8, page 7), of best construction, for portraits 8½ by 6½ inches, or views 11 by 9 inches, with Waterhouse's central stops	12	12	0

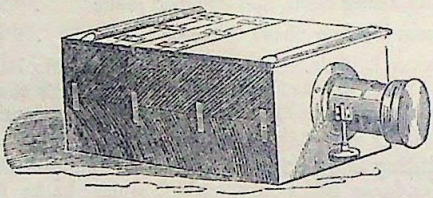

Fig. 15.

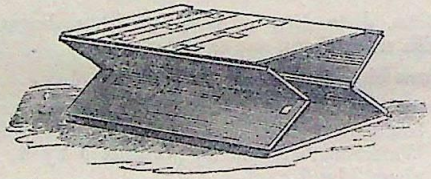

Fig. 16.

BLAND & Co.'S PORTABLE FOLDING CAMERAS FOR LANDSCAPES.

This form of Camera will be found of great convenience where portability is a desideratum, and consequently most efficient for the purposes of the tourist and traveller.

These instruments are of the best workmanship, and are so constructed as not to warp nor lose their figure when exposed to the sun and weather in any climate.

	£	s.	d.
No. 1. **Portable folding Camera,** (*Figs.* 15, 16, of best Spanish mahogany, French-polished, with one double back, for holding two pieces of glass or prepared paper, sliding front for adjusting foreground and sky, focussing glass, &c., for pictures 7 by 6 inches	4	0	0

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		£	s.	d.
No. 2.	Ditto, ditto, fitted with single Achromatic lens, mounted in brass sliding tube, for pictures 7 by 6 inches. No. 5, page 6	6	7	0
No. 3.	**Portable folding Camera,** with one double back for holding two pieces of glass or prepared paper, sliding front for adjusting foreground and sky, focussing glass, &c., for pictures 9 by 7 inches .	5	10	0
No. 4.	Ditto, ditto, fitted with single Achromatic lens, $2\frac{5}{8}$ inches diameter, mounted in brass sliding tube, taking pictures 9 by 7 inches. No. 6, page 6	8	4	6
No. 5.	**Portable folding Camera,** with one double back for holding two pieces of glass or prepared paper, sliding front for adjusting foreground and sky, focussing glass, &c., for pictures 10 by 8 inches	6	10	0
No. 6.	Ditto, ditto, fitted with single Achromatic lens, 3 inches diameter, mounted with rackwork adjustment, taking pictures 10 by 8 inches .	11	0	0
No. 7.	**Portable folding Camera,** with one double back for holding two pieces of glass or prepared paper, sliding front for adjusting foreground and sky, focussing glass, &c., for pictures 11 by 9 inches	7	10	0
No. 8.	Ditto, ditto, with single Achromatic lens, 3 inches diameter, mounted with rackwork adjustment, taking pictures 11 by 9 inches. No. 7, page 6	12	10	0
No. 9.	**Portable folding Camera,** with one double back for holding two pieces of glass or prepared paper, sliding front for adjusting foreground and sky, focussing glass, &c., for pictures 12 by 10 inches	8	10	0
No. 10.	Ditto, ditto, fitted with single Achromatic lens, mounted with rackwork adjustment, producing pictures 12 by 10 inches. No. 8, page 6 . .	14	10	0
No. 11.	**Portable folding Camera,** with one double back for holding two pieces of glass or prepared paper, sliding front for adjusting foreground and sky, ground focussing glass, &c., for pictures 15 by 12 inches	10	0	0

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		£	s.	d.
No. 12.	Ditto, ditto, fitted with single Achromatic lens, mounted with rackwork adjustment, for producing pictures 15 by 12 inches. No. 9, page 6	17	7	0

Lenses of any other makers can be supplied to order for the above Cameras.

Larger sizes made to order.

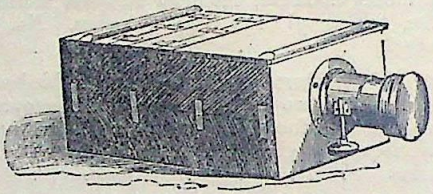

Fig. 17.

BLAND & CO.'S PORTABLE FOLDING CAMERAS FOR PORTRAITS AND VIEWS.

Fig. 17.

Bland & Co.'s portable folding Cameras, fitted with compound achromatic lenses, in handsome brass mounting, with rackwork adjustment, and capable of being altered for both portraits and views. *Figs.* 3 and 4, page 7.

		£	s.	d.
No. 1.	**Portable folding Camera,** of French-polished mahogany, sliding front for adjustment of foreground and sky, one double back for glass or paper, and one single back with two loose frames for plates, fitted with compound lens of best construction, capable of producing portraits 5 by 4 inches, and views 7 by 6 inches . .	7	10	0
No. 2.	**Portable folding Camera,** as above, of French-polished mahogany, fitted with compound achromatic lens, of best construction, capable of producing portraits 6 by 5 inches, and views 9 by 7 inches	11	10	0
No. 3.	**Portable folding Camera,** as above, of French-polished mahogany, for producing portraits 8½ by 6½ inches, and views 12 by 10 inches . .	22	0	0

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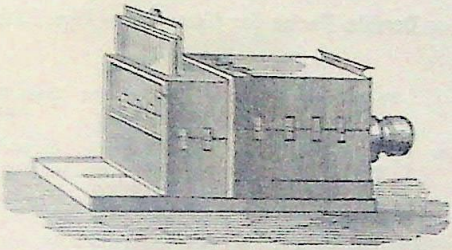

Fig. 18.

SLIDING BODY FOLDING CAMERA.

Best Spanish mahogany, French-polished, sliding-body folding Camera, with one single back, two loose frames, focussing glass in frame, and with vertical and horizontal sliding front for adjustment of foreground and sky (*Fig.* 18).

		Plain.			Brass Binding, Extra.		
		£	s.	d.	£	s.	d.
No. 1, for plates	7 by 5	4	10	0	0	15	0
No. 2, "	9 by 7	5	0	0	1	0	0
No. 3, "	10 by 8	6	0	0	1	5	0
No. 4, "	11 by 9	7	10	0	1	7	6
No. 5, "	12 by 10	8	5	0	1	10	0
No. 6, "	15 by 12	11	0	0	1	15	0
No. 7, "	18 by 16	17	10	0	2	5	0
No. 8, "	24 by 22	24	0	0	3	10	0

The above can be had of Brass & Co., framed and panelled, or with fine screw focussing adjustment at an additional cost.

Brass & Co.'s lenses, as per list (pages 6 & 7, *Figs.* 2 & 4), can be supplied with the above Cameras, or those of other makers, to order.

Sliding Fronts adapted to Cameras for the adjustment of foreground and sky, price according to size—6 by 5, or 7 by 6 inches, 7s. 6d. each; 9 by 7, 10 by 8, and 11 by 9, 10s. 6d. each, &c.

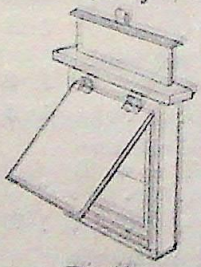

Fig. 19.

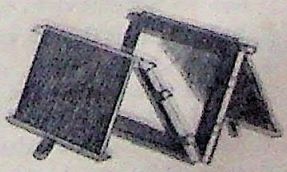

Fig. 20.

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Single or **Double Backs** for Cameras:—(*Figs.* 19 and 20.)

For Stereoscopic Pictures.

	Single Backs and 2 inner Frames (*Fig.* 19). £	s.	d.	Double Backs (*Fig.* 20). £	s.	d.	Brass Binding, Extra.
For plates	6¾ by 3¼	0	12 0	0	15	0	4s. and 5s.
,,	7 by 6	0	18 0	1	2	0	4s. 6d., 5s. 6d.
,,	8½ by 6½	1	1 0	1	5	0	5s., 5s. 6d.
,,	9 by 7	1	2 6	1	7	6	5s., 6s.
,,	10 by 8	1	6 6	1	10	6	5s. 6d., 6s. 6d.
,,	11 by 9	1	9 6	1	15	0	6s., 7s.
,,	12 by 10	1	12 0	2	0	0	6s., 7s.
,,	15 by 12	2	5 0	2	15	0	7s., 8s.
,,	18 by 16	2	15 0	3	10	0	8s., 9s.
,,	24 by 20	3	5 0	4	0	0	9s., 10s.

Extra Openings to Cameras, according to size of Camera, from 5s. upwards.

FRENCH CAMERAS IN WALNUT WOOD,

OBLONG, UNPOLISHED.

	£	s.	d.
No. 1. ¼-plate **Walnut Camera**	0	10	0
No. 2. Ditto, fitted with compound lens, for portraits	1	4	0
No. 3. ½-plate **Walnut Camera**	0	14	0
No. 4. Ditto, fitted with compound lens, for portraits	2	14	0
No. 5. Whole-plate **Walnut Camera**	1	0	0
No. 6. Ditto, fitted with compound lens, for portraits	6	0	0

FRENCH WALNUT-WOOD CAMERAS, SQUARE.

	£	s.	d.
No. 1. ¼-plate square Camera, walnut wood	0	14	0
No. 2. Ditto, ditto, fitted with compound Achromatic lens, for portraits up to 4¼ by 3¼ inches	1	8	0
No. 3. ½-plate walnut Camera, square	1	3	0
No. 4. ½-plate walnut Camera, square, fitted with compound Achromatic lens, for portraits up to 6½ by 4¾ inches	3	3	0
No. 5. Whole-plate square walnut Camera	1	10	0
No. 6. Ditto, ditto, fitted with compound Achromatic lens, for portraits up to 8½ by 6½ inches	6	10	0

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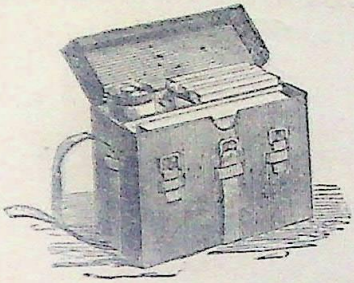

Fig. 21.

SOLID LEATHER CASES,

For Folding Cameras, or Sliding Body Folding Cameras.

(*Fig.* 21.)

			£	s.	d.
No. 1.	For a Camera, for plates	7 by 6	1	10	0
2.	"	9 by 7	1	14	0
3.	"	10 by 8	1	16	0
4.	"	11 by 9	2	5	0
5.	"	12 by 10	2	12	6
6.	"	15 by 12	3	13	6

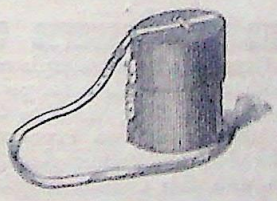

Fig. 22.

LEATHER SLING CASES FOR LENSES.

			£	s.	d.
No. 1.	For a Lens 2 inch diameter		0	10	0
2.	" 2½		0	12	0
3.	" 3		0	13	6
4.	" 4		1	3	6
5.	" 5		1	8	6

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STEREOSCOPIC CAMERAS.

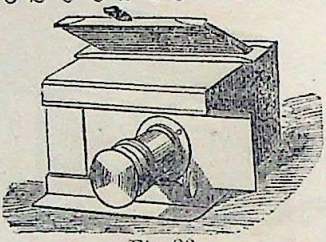

Fig. 23.

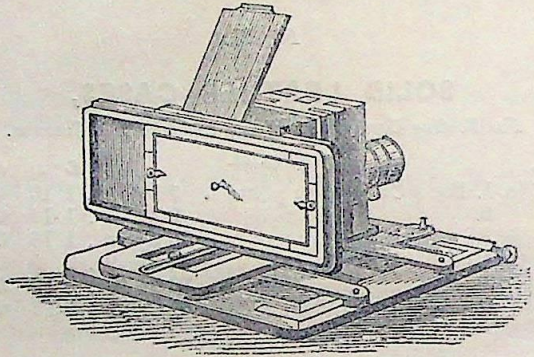

Fig. 24.

SINGLE LENS STEREOSCOPIC CAMERAS.

	£	s.	d.
No. 1. **Stereoscopic Camera**, of most simple construction, fitted with compound lens for portraits or views, mounted on sliding front to take the stereoscopic pictures at two exposures; one single back for plates and ground glass (*Fig.* 23)	2	15	0

The picture taken with this Camera requires to be reversed when mounted, in order to obtain the proper stereoscopic effect.

No. 2. Stereoscopic Camera, of best construction, mounted on boards, with parallel adjustment, on Latimer Clarke's principle, steel-adjusting screw, long shifting back for stereoscopic plates, and ground focussing glass (*Fig.* 24)	3	0	0
Single back, adapted to the above, with loose frame for portraits	0	10	0
Brass binding above Camera	1	5	0
BLAND & Co.'s compound Achromatic Lens, with Waterhouse's Central Stop for use with the above, for portraits or views	2	15	0

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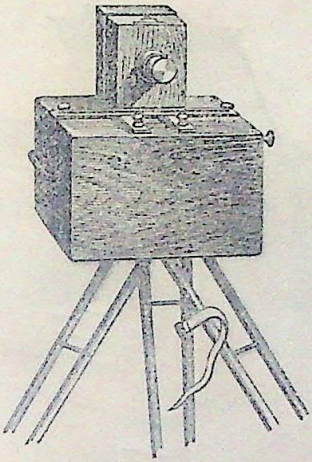

Fig. 25.

STEREOSCOPIC TOURISTS' CAMERA.

This Camera is admirably adapted for working with the Dry Process; it is constructed on Latimer Clarke's principle, and has six dark slides for prepared plates or paper. It is fitted with a compound achromatic lens, which, with the Camera, backs and top of stand, pack into the mahogany box, the outside measurement being 11 by 9 by 9 inches, £7 7s.; or, with portable stand, £8 8s. (*Fig.* 25.)

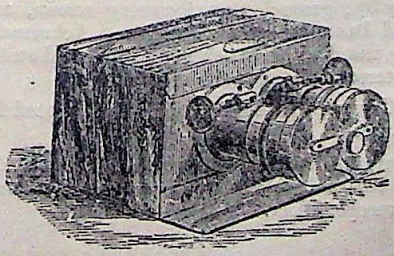

***Fig.* 26.**

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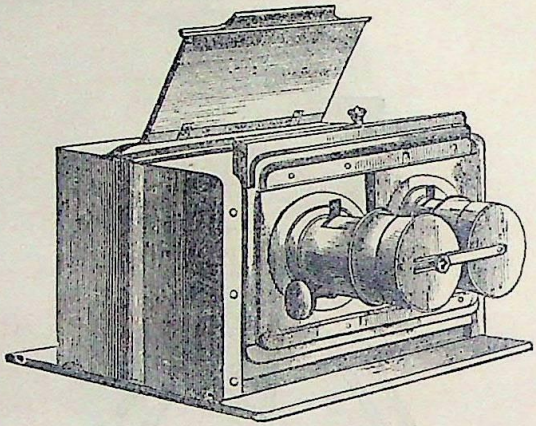

Fig. 27.

DOUBLE LENS STEREOSCOPIC CAMERAS.

		£	s.	d.
No. 1.	Mahogany French-polished sliding body Camera (*Fig.* 26), with single back and focussing glass, to take plate in back, size 6¾ by 3¼, with two compound Achromatic lenses, of coincident foci suited for Stereoscopic portraits or views . .	4	10	0
No. 2.	Very superior Spanish mahogany sliding body Camera (*Fig.* 27), with rising front and rack separation for lenses, shifting bar for connecting caps of lenses, one single back, to take plates 7¾ by 4¼, and loose frame for Stereoscopic size 6¾ by 3¼., ground glass focussing screen, and two of BLAND and Co.'s compound Achromatic lenses, fitted with Waterhouse's stops, and suited for Stereoscopic portraits or views . . .	7	7	0

N.B. This Camera, with its lenses, is also adapted for two Carte de Visite pictures on the plate, 7¾ by 4¼.

It is necessary to state that the pictures taken by Nos. 1 and 2, require to be reversed when they are mounted, in order to obtain the true stereoscopic effect.

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BLAND AND CO.'S

IMPROVED TOURISTS' STEREOSCOPIC CAMERAS.

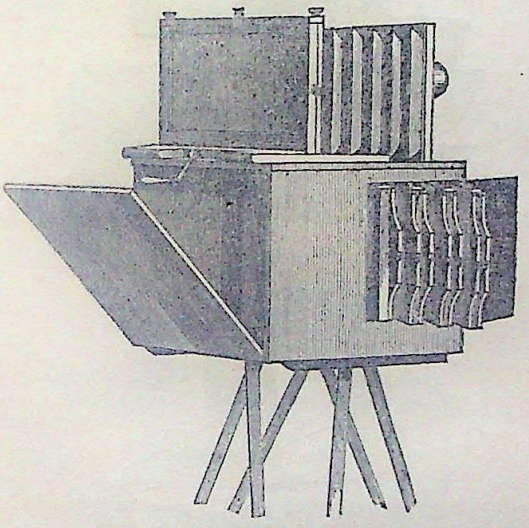

Fig. 28.

	£	s.	d.
No. 3. BLAND and Co.'s improved Tourists' Binocular Stereoscopic Bellows body Camera (*Fig.* 28), with screw adjustment to back part of Camera for focussing; three double backs, each for holding two prepared plates, size 6¾ by 3¼, and one single back, for wet or dry process; ground glass focussing screen, very portable, packing into a mahogany case, outside dimensions 8¾ by 5 by 5½, price without lenses	6	10	0
No. 3A. Ditto, ditto, with two Achromatic view lenses .	8	8	0
No. 3B. Or with two of BLAND and Co.'s Compound Achromatic Lenses, with Waterhouse's stops, for portraits and views	12	0	0

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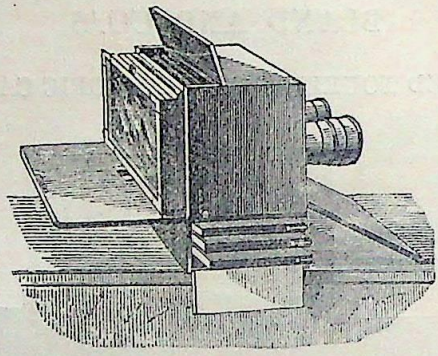

Fig. 29.

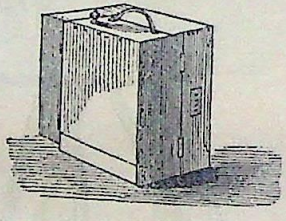

Fig. 30.

Fig. 29 represents the Camera, with case of three double backs attached, which are not included in price of No. 4, but are included in No. 5.

		£	s.	d
No. 4.	Improved Tourists' Stereoscopic Binocular Camera (*Fig.* 29), designed by Mr. C. D. Smith, of best Spanish French-polished mahogany, with Bellows body, rising front and separating rack adjustment, for increasing distances between lenses; simple arrangement for reversing lenses into body of Camera when travelling; one single back and focussing screen; size when shut up for travelling (*Fig.* 30) about 9¾ by 6½ by 5½, price without lenses, and lower case of backs	5	15	0
No. 4A.	Pair of BLAND and Co.'s single Achromatic view lens, for above, extra	1	15	0

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	£	s.	d.
No. 4B. Pair of BLAND and Co.'s compound Achromatic lenses, with Waterhouse's stops, for either portraits or views, extra	5	10	0
No. 5C. Improved Tourists' Stereoscopic Binocular Camera, as above, with addition of rack adjustment to body for focussing at back, WITH CASE, containing three double backs (*Fig.* 29), for use for dry processes, price without lenses . .	8	8	0

N.B. The case containing the double backs can, by a very simple arrangement, be attached or detached from body of camera, as required.

Lenses for this camera same as described with the foregoing.

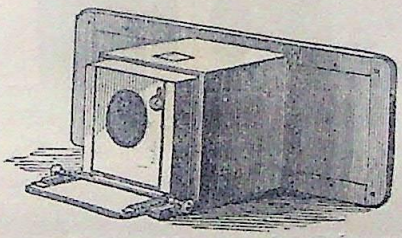

Fig. 31.

BLAND & CO.'S CARTE DE VISITE CAMERAS.

	£	s.	d.
No. 1. Mahogany square sliding body French-polished Camera, with one single back and focussing screen for taking single Carte de Visite pictures, as per page 26, fig. 12, No. 1	1	5	0
No. 1A. BLAND and Co.'s compound Achromatic Carte de Visite lens, with Waterhouse's stops for above, extra	2	15	0
Brass binding, for above, extra	0	15	0

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	£	s.	d.
No. 2. BLAND and Co.'s improved single lens Carte de Visite Camera (*Fig.* 31), arranged for taking two pictures. This Camera is of the sliding body form, with improved rack motion for focussing lenses from the front, and made of best Spanish mahogany, with long frame for containing the back and focussing screen . .	3	10	0
Brass binding, for above, extra	0	15	0
No. 2A. BLAND and Co.'s best Carte de Visite lens for above, with Waterhouse's stops . . .	2	15	0

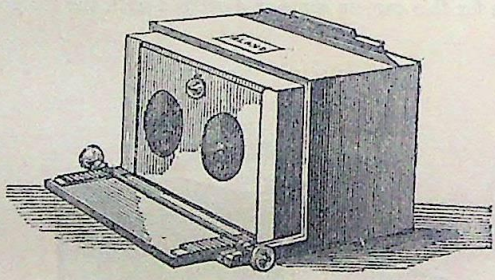

Fig. 32.

No. 3. BLAND and Co.'s improved binocular Camera, as per fig. 32, for operating room, of best Spanish mahogany, with rack adjustment, focussing from front, rising front, one single back and focussing glass	4	15	0
Brass binding, extra	0	15	0

For price of lenses for above, see page 8, according to length of operating room.

Lenses of any other makers adapted to this or any other Carte de Visite Camera.

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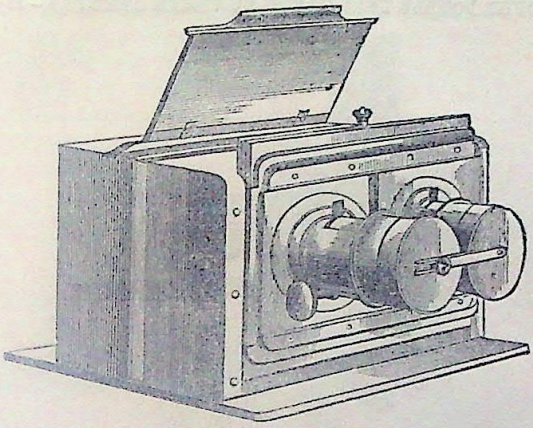

Fig. 33.

	£	s.	d.
No. 4. BLAND and Co.'s improved Camera, arranged for Carte de Visite and Stereoscopic Pictures, consisting of a very superior Spanish mahogany Sliding Body Camera, with rising front and rackwork separation for lens (*Fig.* 33); shifting bar for connecting caps of lenses; one single back to take plates 7¾ by 4¼ inches for two Carte de Visite pictures at one exposure; ground glass focussing screen. This Camera has also a loose frame to take plates of ordinary stereoscopic size, with two of BLAND and Co.'s Compound Achromatic Lenses, fitted with Waterhouse's diaphragms, and suited for two Carte de Visite portraits, or for stereoscopic portraits and views	7	7	0

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BLAND AND CO.'S

IMPROVED DOUBLE LENS CARTE DE VISITE CAMERAS.—*Figs.* 34, 35.

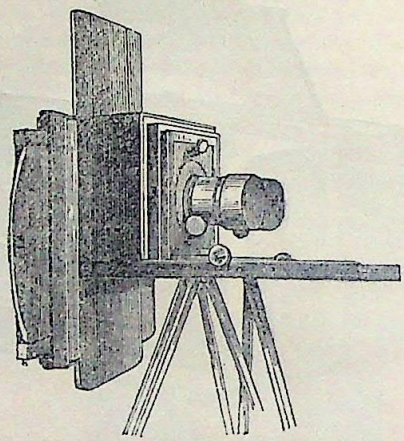

Fig. 34.

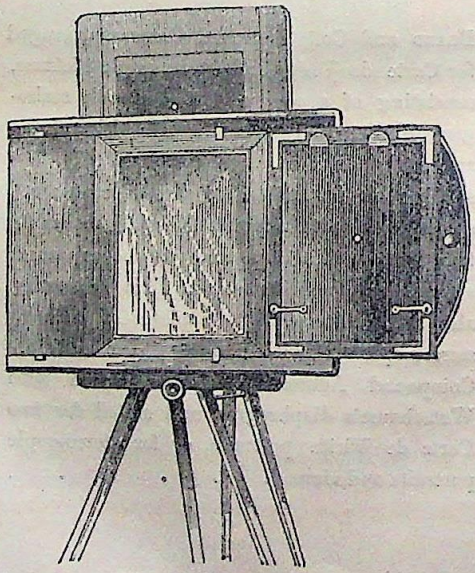

Fig. 35.

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		£	s.	d.
No. 5.	BLAND and Co's improved Carte de Visite Camera for the operating room, for TWO lenses to take FOUR pictures by two exposures, long frame, holding back and ground glass, having horizontal and vertical motions, as per figs. 34 & 35	9	9	0
	Brass binding, extra	1	10	0
	Swing Backs for Carte de Visite Camera, extra, from, each	1	5	0

For lenses suitable for above Camera, according to length of room, see page 8.

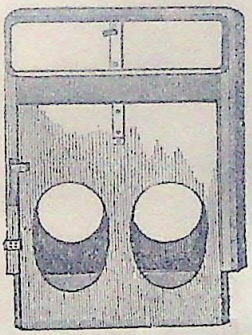

Fig. 36.

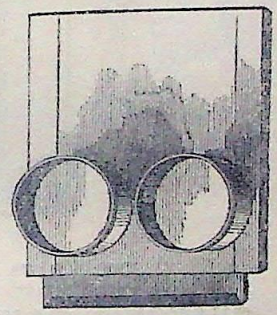

Fig. 37.

BLAND AND CO.'S

NEW INSTANTANEOUS SHUTTER.

BLAND and Co.'s improved instantaneous Shutter, which admits of rapid exposure for fast moving objects, landscapes, &c.; also for use in taking portraits of children.

This Shutter has an arrangement for regulating the time of exposure at the will of operator, and can be adapted to the hood of lens of any camera.

Fig. 36 represents the front view of shutter adapted for stereoscopic Bi-Lens Camera.

Fig. 37 the back part sliding on to hoods of lenses, price from £1 1s. upwards.

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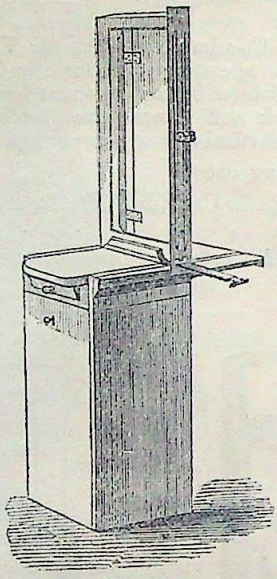

Fig. 38.

BLAND AND CO.'S

CHANGING BOXES, OR DARK BOXES,

For transferring Dry Plates to Camera Backs in Open Air, &c.
(*Fig.* 38.)

These boxes can be adapted to any sized Camera, but require the Camera back to be specially made for the purpose.

	£	*s.*	*d.*
For Stereoscopic size, to hold 1 doz. plates . . .	2	5	0
For size, 7 by 6 „ . . .	2	10	0
„ 9 by 7 „ . . .	3	0	0
„ 10 by 8 „ . . .	3	7	6
„ 11 by 9 „ . . .	4	0	0
„ 12 by 10 „ . . .	4	10	0

The above prices do not include the Camera back. The prices of corresponding sizes of which are the same as single backs, see page 34 (*Fig.* 19).

The same construction of changing box can be applied to double backs, where two plates can be changed at one operation, at an additional expense.

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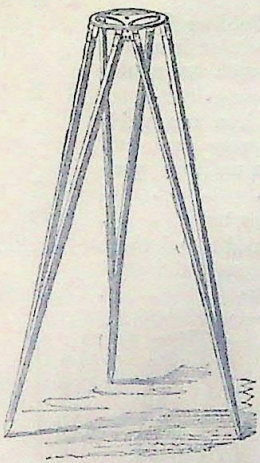

Fig. 39.

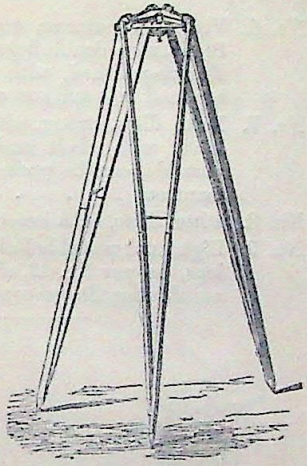

Fig. 40.

CAMERA STANDS.

To ensure success in taking either portraits or views, it is absolutely essential that the Camera should be perfectly free from vibration; if this be not the case, it is obviously impossible to obtain a perfectly sharp impression. Lightness, with freedom from vibration, are combined in the Stands offered in the following list:—

		£	s.	d.
No. 1.	Tripod Stand, with round iron top and bolt and screw. Double legs of ash for small Camera (*Fig.* 39)	0	7	6
No. 2.	Ditto, ditto, superior make, round brass top, screw and bolt, and French-polished (*Fig.* 39) .	0	10	0
No. 3.	Ditto, ditto, with 4-inch triangular metal top (*Fig.* 40), with double legs and brass stretchers, bolt, screw, and nut	0	16	6
No. 4.	Ditto, ditto, very strong, with 6-inch triangular brass top, with bolt and screw, double legs of ash, French-polished, and hinged at bottom with brass stretchers	1	2	6
No. 5.	Ditto, ditto, larger, with 8-inch triangular head for large-sized Camera	1	10	0

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		£	s.	d.
No. 6.	Very light, strong, and firm Folding Tripod Stand, with double legs of ash, jointed in centre, French-polished, with brass 4-inch triangular top, and bolt and screw	1	1	0
No. 7.	Ditto, ditto, strong, with large iron triangular head, with bolt and screw, very firm and portable, can be packed into an ordinary portmanteau	1	7	6
No. 8.	Ditto, ditto, with brass triangular top . .	1	10	0
No. 9.	Light and portable Folding Tripod Stand, three legs, as per fig. 42, of new pattern and design, suitable for Stereoscopic Cameras . . .	1	1	0

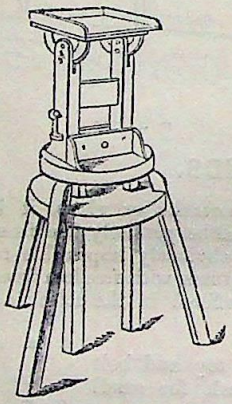

Fig. 41.

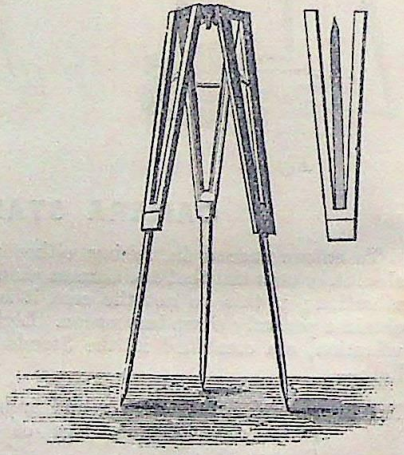

Fig. 42.

CAMERA STANDS FOR OPERATING ROOM.

No. 10.	Table Camera Stand, in white wood, with every adjustment for raising or depressing Camera (*Fig.* 41)	1	1	0
No. 11.	Ditto, ditto, in oak, very strong (*Fig.* 41) . .	1	6	0
No. 12.	Ditto, ditto, in oak, very strong and French-polished, with metal rack adjustment with handle, for raising or depressing Camera, and with horizontal and vertical motion to top of Stand	5	5	0

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	£	s.	d.
No. 13. Table Camera Stand, with Archimedean screw adjustment, in French-polished oak or mahogany, very firm and substantial, with all the most recent improvements and motions . .	9	9	0

HEAD RESTS,

For enabling the Sitter to keep the Head in one position without fatigue. (*Figs.* 43, 44, *and* 45.)

No. 1. Head Rest of simplest form, with screw to attach to back of chair	0	2	0
No. 2. Ditto, ditto, with adjustments for raising, depressing, and placing the head-piece in any required position or inclination, with screw to attach to back of chair (*Fig.* 43) . . .	0	5	0
No. 3. Bland and Co.'s Universal Head Rest, with means of adjustment for every position of the sitter, for attaching to chair (*Fig.* 45) . .	1	2	6

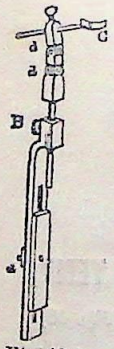

Fig. 43.

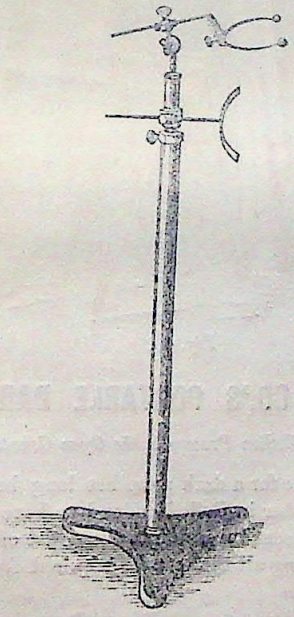

Fig. 44.

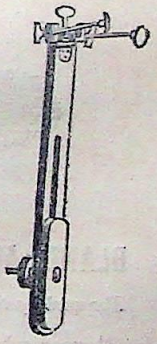

Fig. 45.

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		£	s.	d.
No. 4.	Universal Head Rest, with heavy iron foot, and brass sliding tube, which enables this rest to be used either for standing or sitting posture, without hip rest (*Fig.* 44)	2	15	0
No. 5.	Ditto, ditto, ditto, with hip rest attached, as in *Fig.* 44	3	0	0

DARK TENT.

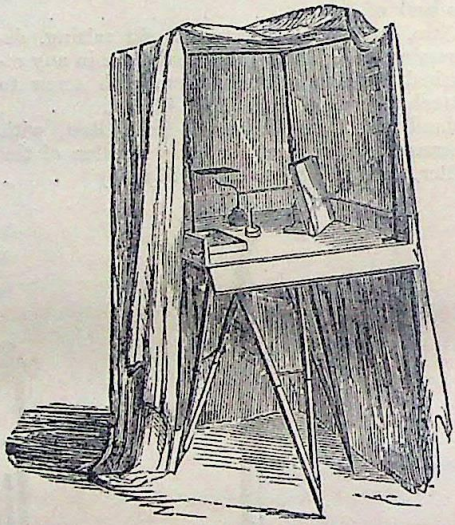

Fig. 46.

BLAND AND CO.'S PORTABLE DARK TENT,

For working the Collodion Process in the Open Country (*Fig.* 46).

A good substitute for a dark room has long been a desideratum to the photographer in Collodion, and we have much pleasure in submitting the present invention to the notice of photographers generally, as combining all that can be required for the purposes of open-air work.

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The Tent consists of a strong and roomy table, mounted on a firm Tripod Stand; from the top of the table at each corner rise four metal supports; these sustain a frame over which is stretched yellow calico. A black calico envelope covers the whole, and enables the operator to work with as great ease in the open country as he would in his own laboratory at home. The black envelope is furnished with a circular aperture at the top, for admitting yellow light to the interior of the tent; there is also a curved bar, which keeps the covering from touching the head of the operator while at work. The envelope is bound at its edge with strong webbing, and iron spikes are attached at intervals in order to secure it to the ground, and prevent the wind and light from getting into the tent.

When not in use, the rods that support the yellow calico chamber double inwards, and fall quite flat; the legs of the Tripod then fold up and are laid on the top; finally, the black calico envelope is folded up, and laid over these, immediately under the cover, which secures the whole, the table of the tent forming the containing box. These tents have been in use for a long time, and we can pronounce them to answer perfectly, and to fulfil all the conditions required in such an apparatus.

The extreme size of outside containing box of a tent, suitable for an operator 6 feet high, is 24 by 18 by 4 inches, forming a portable and compact case. (*Fig.* 47.)

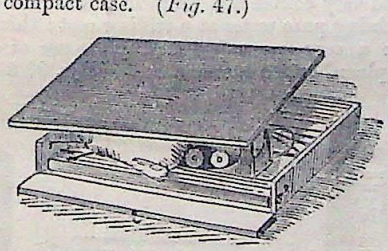

Fig. 47.

	£	s.	d.
Bland & Co.'s portable Dark Tent, for working Collodion in the open air, complete (*Fig.* 46) . . .	3	3	0

Larger sizes made to order.

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LAMPS FOR DARK ROOM.

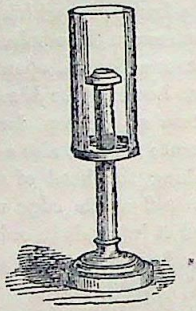

Fig. 48.

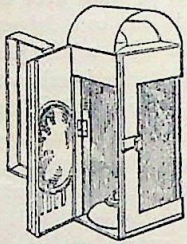

Fig. 49.

	£	s.	d.
Gas Jets, with metal chimney and gauze, with flexible tube, for burning off plates without smoke . each	0	8	0
Lanterns furnished with yellow glass shades, for use in dark room (*Fig.* 49)	0	3	6
Improved form of Photographic Lamp, where the ruby glass can be raised or depressed (*Fig.* 48) . .	0	7	6

PORTABLE STILLS.

It is found very convenient frequently to have at hand the means of obtaining pure water at a trifling cost; this desideratum is acquired in a very economical way by the use of a small still, which can be placed over a common fire. (*Figs.* 50 & 51.)

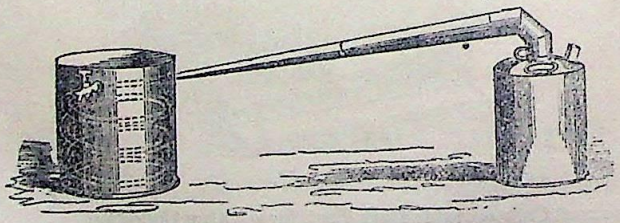

Fig. 50.

	£	s.	d.
Tin Still, to hold half a gallon, with worm tub complete, for use over the common fire (*Figs.* 50 & 51) .	0	14	0
Ditto, ditto, one gallon	0	17	6
Ditto, ditto, two ditto	1	2	0

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	£	s.	d.
Copper Still, half a gallon	1	4	0
Ditto, ditto, one ditto	1	13	6

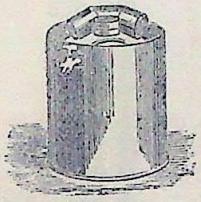

Fig. 51.

PORTABLE STILL,

Packed for Travelling.

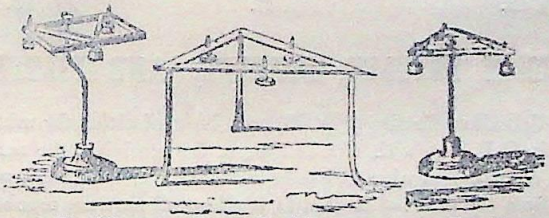

Fig. 52. *Fig.* 53. *Fig.* 54.

LEVELLING STAND,

With adjusting Screws, for laying Plates with Albumen, and Developing and Fixing Collodion Pictures.

		s.	d.
No. 1. size, for plates up to 5 by 4 inches	(*Fig.* 54)	3	0
2. „ „ 7 by 6 „	(*Fig.* 52)	4	0
3. „ „ 9 by 7 „	(*Fig.* 52)	5	6
4. „ „ 12 by 10 „	(*Fig.* 53)	6	6

Fig. 55.

CIRCULAR SPIRIT LEVEL,

For accurately levelling Cameras, or Glass Plates for Developing (*Fig.* 55), each 3s.

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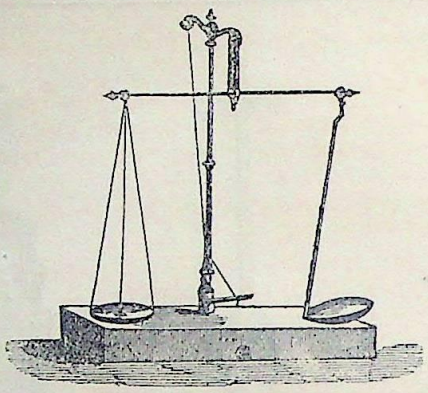

Fig. 63.

		£	s.	d.
No. 1.	In Oak box metal pans (*Fig.* 62) with set of drachm, scruple, and grain weights . .	0	2	6
2.	Ditto, ditto, larger	0	5	0
3.	Ditto, superior beam and glass pans in box .	0	5	9
4.	Balance, with brass pillar and shifting glass pan mounted on mahogany box, with drawer (*Fig.* 63)	1	10	0

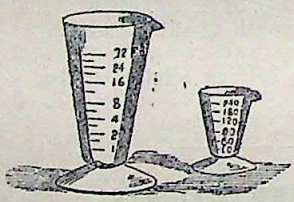

Fig. 64.

Fig. 65.

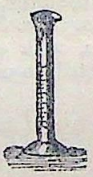

Fig. 66.

GLASS GRADUATED MEASURES,

(*Figs.* 64, 65, 66),

Accurately divided, of either Cylindrical or Conical form.

	s.	d.		s.	d.
Contents 1 ounce, each	0	10	Contents 8 ounces, each	2	6
„ 2 „	1	0	„ 10 „	3	0
„ 4 „	1	6	„ 20 „	3	6
„ 6 „	2	3	„ 40 „	6	6

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		s.	d.
Minim measures (*Fig.* 66)	60 drops . .	1	0
Ditto	120 „ . .	1	3

Stirring Rods, of glass, each, 3d. and 4d.

Filter Rings or Supports, as on top of fig. 65, very useful for filtering small quantities of solution without a funnel, each, 3d., 4d., and 6d.

Glass Syringes, for taking up small quantities of liquids, plain, from 6d.; graduated, from 1s.

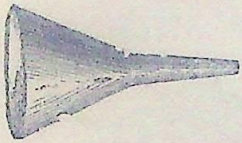

Fig. 67.

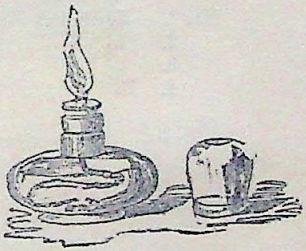

Fig. 68.

Glass Spirit Lamps (*Fig.* 68), each, 9s., 1s., 2s., and 3s.

Glass Funnels (*Fig.* 67), *Ribbed Inside, for Filtering Solutions.*

		s.	d.			s.	d.
No. 1.	2 ins. diameter	0	4	No. 4.	4 ins. diameter .	0	7
2.	2½ „	0	5	5.	5 „	0	8
3.	3 „	0	6	6.	6 „	1	0

No. 7. 7 ins. diameter . 1s. 3d.

GUTTA PERCHA FUNNELS.—(*Fig.* 67.)

3 in., 6d. 3½ in., 9d. 4½ in., 1s. 5 in., 1s. 3d.

WEDGEWOOD WARE FUNNELS.—(*Fig.* 67.)

Funnels, Wedgewood, cream colour, ribbed inside:—

		s.	d.
No. 1.	2 inches diameter . . .	0	4
2.	3½ „ . . .	0	6
3.	4 „ . . .	0	8
4.	5 „ . . .	1	0
5.	6 „ . . .	1	6
6.	6½ „ . . .	1	10

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EBONITE FUNNELS.—(*Fig.* 67.)

		s.	d.			s.	d.
No. 1.	1 oz. capacity .	0	10	No. 5.	6 oz. capacity .	1	9
2.	2 „	1	0	6.	8 „	2	3
3.	3 „	1	3	7.	10 „	2	6
4.	4 „	1	6	8.	16 „	3	3

Filter Paper, cut round, in packets of 100 each.

		s.	d.
No. 1.	$5\frac{1}{2}$ inches diameter . . .	0	10
2.	$7\frac{1}{2}$ „ . . .	1	0
3.	$9\frac{1}{2}$ „ . . .	1	3
4.	13 „ . . .	1	9

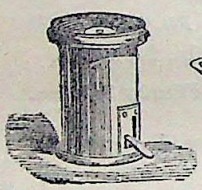

Fig. 69.

Fig. 70.

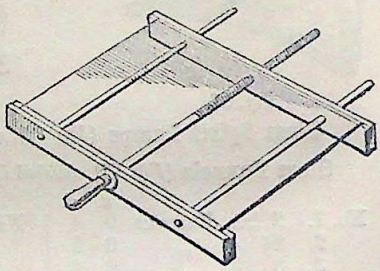

Fig. 71.

	£	s.	d.
Pneumatic Plate Holder, simple form (*Fig.* 70) .	0	1	0
Ditto, small, with lever (*Fig.* 69)	0	2	6
Ditto, ditto, large, with lever (*Fig.* 69) . . .	0	3	6
Globe Plate Holders, each	0	4	6

Plate Cleaner, with Screw Adjustment, for cleaning Plates of various sizes, 4s. 6d. and 5s. 6d (*Fig.* 71).

Plate-cleaning liquid, per bottle, 6d. and 1s.

Leathers for cleaning glass plates, 1s. and 1s. 6d.

India-rubber Finger-stalls, each, 4d.

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COLLODION DIPPING BATHS.

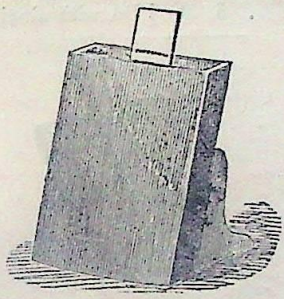

Fig. 72.

GUTTA PERCHA DIPPING BATHS,

Inclined with Hinged Wood Back and Glass Dipper (*Fig.* 72).

		£	*s.*	*d.*
No. 1. size, for plates,	4¼ by 3¼	0	2	9
2. „	5 by 4	0	4	0
3. „	6½ by 4¾	0	4	6
4. „	6 by 5	0	4	6
5. „	7¾ by 4¼	0	6	0
6. „	8½ by 6½	0	7	6
7. „	9 by 7	0	8	6
8. „	10 by 8	0	11	0
9. „	12 by 10	0	15	0
10. „	15 by 12	1	1	6
11. Stereoscopic	6¾ by 3¼	0	4	3

EBONITE BATHS.

PATENT EBONITE BATHS.

	£	*s.*	*d.*		£	*s.*	*d.*
5 by 3⅝ each	0	4	3	12½ by 9½ each	0	13	0
7¾ by 5¼ „	0	6	0	13 by 9½ „	0	13	6
9¾ by 7¼ „	0	8	6	13½ by 10½ „	0	14	6
11½ by 8½ „	0	10	6	14½ by 10½ „	0	15	0
12 by 8½ „	0	11	6	16½ by 13½ „	1	0	0

PATENT EBONITE BATHS, WITH AIR-TIGHT TOPS.

5 by 3⅝ each	0	8	0	12½ by 9½ each	1	3	0
7¾ by 5¼ „	0	12	0	13 by 9½ „	1	4	0
9¾ by 7¼ „	0	15	0	13½ by 10½ „	1	5	0
11½ by 8½ „	1	0	0	14½ by 10½ „	1	6	0
12 by 8½ „	1	1	6	16½ by 12½ „	1	11	0

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PATENT EBONITE BATHS—STEREOSCOPIC.

	s.	d.		s.	d.
8¾ by 3¾ ins. each .	5	0	Do. with air-tight top, each	8	6

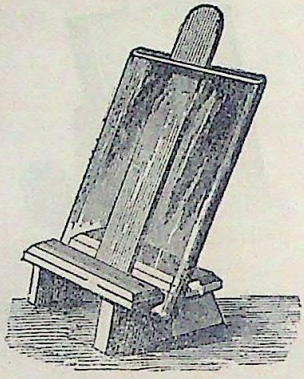

Fig. 73.

GLASS DIPPING BATHS,

Of Solid White Moulded Glass, fitted in Mahogany Stand, with Glass Dipper (*Fig.* 73).

		£	s.	d.
No. 1. for plates .	4¼ by 3¼ .	0	4	6
2. „ .	5 by 4 .	0	6	0
3. „ .	6½ by 4¾ .	0	7	6
4. „ .	6 by 5 .	0	7	6
5. „ .	7¾ by 4¼ .	0	8	6
6. „ .	9 by 7 .	0	10	6
7. „ .	10 by 8 .	0	15	0
8. „ .	12 by 10 .	0	18	6
9. Stereoscopic .	6¾ by 3¼ .	0	6	6

PORCELAIN BATHS,

Without Stand and Dipper.

No. 1. for plates .	4¼ by 3¼ .	0	2	0
2. „ .	5 by 4 .	0	2	9
3. „ .	6½ by 4¾ .	0	3	6
4. „ .	8½ by 6½ .	0	4	0
5. „ .	9 by 7 .	0	5	6
6. „ .	10 by 8 .	0	8	0
7. „ .	12 by 10 .	0	11	0
8. „ .	15 by 12 .	1	1	0
9. Stereoscopic .	6¾ by 3¼ .	0	4	0

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WATERTIGHT GUTTA PERCHA BATHS,

With Dipper and Hinged Back, for containing Solution when Travelling.

			£	s.	d.
No. 1.	for plates	5 by 4	0	8	0
2.	„	6½ by 4¾	0	9	6
3.	„	8½ by 6½	0	12	6
4.	„	9 by 7	0	14	0
5.	„	10 by 8	0	18	6
6.	„	11 by 9	1	2	6
7.	„	12 by 10	1	4	0
8.	„	15 by 12	1	15	0
	Stereoscopic	6¾ by 3¼	0	8	6

WATERTIGHT GLASS BATHS,

With Dipper, mounted in Mahogany Cases, French-polished.

			£	s.	d.
No. 1.	for plates	5 by 4	0	17	6
2.	„	6½ by 4¾	1	1	0
3.	„	8½ by 6½	1	8	6
4.	„	9 by 7	1	10	0
5.	„	10 by 8	1	15	0
6.	„	12 by 10	2	5	0
7.	„	15 by 12	3	3	0
8.	Stereoscopic	6¾ by 3¼	1	0	0

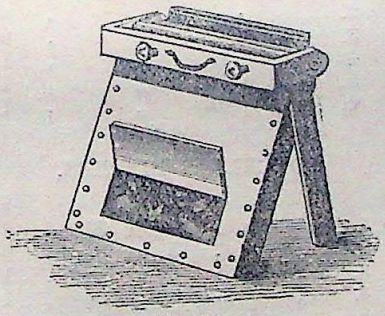

Fig. 74.

BLAND AND CO.'S IMPROVED WATERTIGHT GLASS BATHS.

(*Fig.* 74.)

With accurately fitted Ground Glass Cover. The upper portion of the framework at top is hinged, and when the bath is in use, can

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be turned over, as in figure, and at once be put into its place when the bath is out of use; a shutter is placed at bottom lined with yellow glass, so that the bottom of bath can be examined as to its freedom from sediment; this contrivance will be found of great use in India, or tropical climates. Screwed and brass bound.

			£	s.	d.
No. 1.	for plates	5 by 4	1	0	0
2.	"	6½ by 4¾	1	10	0
3.	"	9 by 7	2	0	0
4.	"	10 by 8	2	10	0
5.	"	11 by 9	2	15	0
6.	"	12 by 10	3	3	0
7.	"	15 by 12	4	4	0
8.	Stereoscopic	6¾ by 3¼	1	10	0

DIPPERS FOR COLLODION BATHS.

Fluted Glass Dippers, in One Piece, allowing the Fluid to drain down from Back of the Plate.

			s.	d.
No. 1.	length	6 inches each	0	6
2.	"	8 "	0	9
3.	"	9 "	0	10
4.	"	11 "	1	0
5.	"	13 "	1	3
6.	"	16 "	1	9

PORCELAIN DIPPERS.

			s.	d.
No. 1.	for plates	4¼ by 3¼	0	8
2.	"	5 by 4	0	11
3.	"	6½ by 4¾	1	2
4.	"	8½ by 6½	1	6
5.	"	10 by 8	1	9
6.	"	12 by 10	2	0

SILVER WIRE DIPPERS,

From 7s. 6d. upwards.

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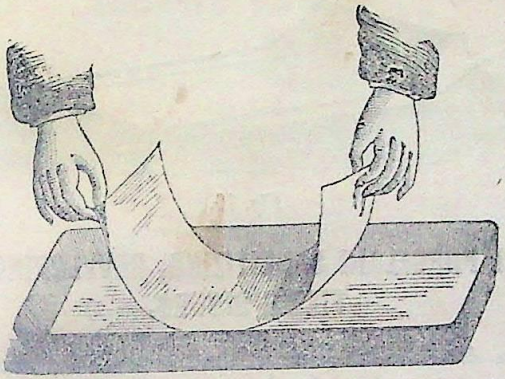

Fig. 75.

PORCELAIN DISHES,

For Sensitizing or Albumenizing Paper, and for Washing Paper Pictures, with Spout.

			Porcelain Pans, Shallow.			Porcelain Pans, Deep.		
			£	s.	d.	£	s.	d.
No. 1.	for Paper	5 by 4	0	0	9	0	0	11
2.	Stereoscopic	6¾ by 3¼	0	1	0	0	1	3
3.	for Paper	8 by 6	0	1	3	0	1	6
4.	„	9 by 7	0	1	6	0	1	9
5.	„	10 by 8	0	1	9	0	2	0
6.	„	11 by 9	0	2	6	0	2	9
7.	„	12 by 10	0	3	0	0	3	6
8.	„	13 by 11	0	4	0	0	5	0
9.	„	16 by 12	0	6	6	0	7	6
10.	„	16 by 13	0	7	0	0	8	6
11.	„	19 by 12	0	9	0	0	10	6
12.	„	20 by 16	0	15	0	0	17	6
13.	„	24 by 19	1	1	0	1	5	0

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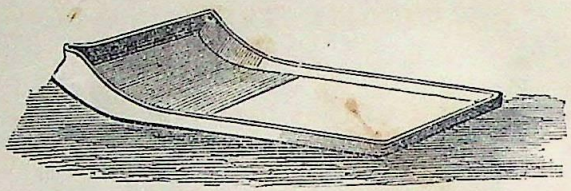

Fig. 76.

WELL PORCELAIN SENSITIZING, DEVELOPING, OR FIXING DISHES.

These dishes are very convenient for sensitizing wet or dry collodion plates, or for their subsequent manipulation, as, from the construction of them, a very small quantity of solution is required. (*Fig.* 76.)

			s.	d.
No. 1.	for plates .	$6\frac{3}{4}$ by $3\frac{1}{4}$.	2	6
2.	„ .	$6\frac{1}{2}$ by 5 .	3	6
3.	„ .	$8\frac{1}{2}$ by $6\frac{1}{2}$.	5	6
4.	„ .	9 by 7 .	6	6
5.	„ .	10 by 8 .	7	6
6.	„ .	11 by 9 .	9	0
7.	„ .	12 by 10 .	10	6

GUTTA PERCHA WASHING TRAYS.

		s.	d.
No. 1.	size, 8 by 6 by 1 inch, inside measurement	2	0
2.	„ 9 by 7 by $1\frac{1}{4}$ „	3	0
3.	„ 10 by 8 by $1\frac{1}{4}$ „	3	6
4.	„ 11 by 9 by $1\frac{1}{2}$ „	4	6
5.	„ 12 by 10 by $1\frac{1}{2}$ „	5	6
6.	„ 13 by 11 by $1\frac{1}{2}$ „	6	0
7.	„ 14 by 12 by 2 „	8	6
8	„ 16 by 12 by 2 „	10	0
Or in nests of three useful sizes, Nos. 1, 2, & 3 .		8.	6
„	„ 2, 3, & 4 .	11	0
„	„ 4, 5, & 6 .	16	0

Larger sizes made to order, and mounted in wood cases.

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EBONITE TRAYS.

	s.	d.		s.	d.
5 by 3⅝ .	2	6	11 by 9 .	5	3
7¾ by 3¾ .	3	0	11½ by 9½ .	6	0
8 by 6 .	3	6	12 by 10 .	6	6
9½ by 7½ .	4	6	12½ by 10½ .	7	0
	13 by 11			8	0

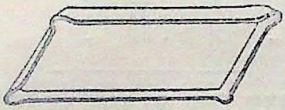

Fig. 77.

GLASS DISHES.—(*Fig.* 77.)

The advantage possessed by these dishes is, that they are entirely unacted upon by the chemicals employed, and therefore can be used for different solutions one after another, without risk of the admixture which is so likely to take place when the pans are of porcelain.

		s.	d.
No. 1.	for stereoscopic plate 7¼ by 3¾ by 1, each	2	0
2.	size 6 by 4½ by 1 „	2	0
3.	„ 8 by 6 by 1 „	3	0
4.	„ 9 by 7 by 1 „	4	6
5.	„ 10 by 8 by 1 „	5	0
6.	„ 11 by 9 by 1 „	6	0
7.	„ 12½ by 10½ by 1 „	7	6

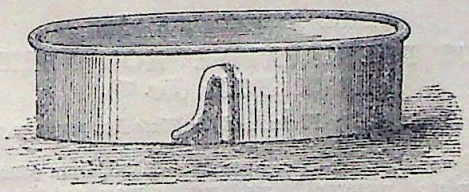

Fig. 78.

ELLIOT'S NEW SYPHON WASHING TROUGH.—(*Fig.* 78.)

Elliot's Syphon Washing Trough, in porcelain, for washing prints. Very useful for Operators or Amateurs, as by the use of it any number of prints may be subjected to the action of a con-

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tinuous stream of water for any time. The pan should be placed with the prints in it in a sink, and a small stream of water let flow into it at a position at right angles to the syphon, which gives the contents of the pan a rotatory motion. When the height of the water reaches the bend of the syphon, the water from the lower part of the pan passes away through the syphon, which is then self-acting as long as water is allowed to pass into the pan.

			s.	d.
No. 1.	Diameter of the pan .	14 inches, each .	12	0
2.	„ .	17 „ „ .	14	0
3.	„ .	19 „ „ .	16	0

BOXES FOR GLASS PLATES.

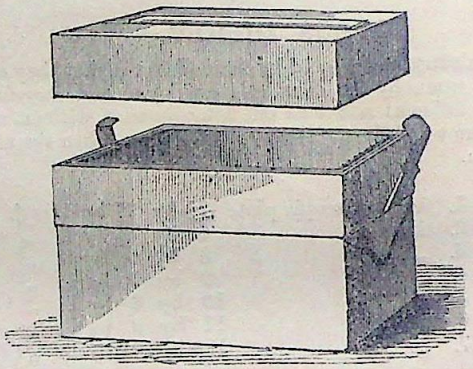

Fig. 79.

BLAND AND CO., AGENTS.

KEENE'S PRESERVATIVE NON-CHEMICAL PLATE BOX (*Fig.* 79),

For storing Sensitized Dry Plates, and for Plate Box purposes generally.

The body of this box is composed of metal, from contact with which the plate is preserved by gutta percha grooves at the ends, and the same material placed at the top and bottom; the lid fits into a deep groove, and is fastened by a simple contrivance, which renders it both light tight and safe. Prepared plates are thus kept free from chemical influence, and may be preserved for the longest possible period. It is universally acknowledged perfect for the purpose, and the very favourable opinion passed upon it, at its intro-

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duction by, among others, the Editor of the PHOTOGRAPHIC NEWS, that it was an admirable and ingenious contrivance likely to come into general use, and *that nothing better could be desired for the purpose*, has since been fully endorsed by photographers both at home and abroad.

			s.	d.
No. 1.	for Stereoscopic plates .	$6\frac{3}{4}$ by $3\frac{1}{4}$ . .	6	0
2.	for plates	$6\frac{1}{2}$ by $4\frac{3}{4}$ . .	6	6
3.	ditto	$7\frac{1}{4}$ by $4\frac{1}{2}$ . .	7	0
4.	ditto	7 by 6 . .	7	6
5.	ditto	$8\frac{1}{2}$ by $6\frac{1}{2}$ . .	8	6
6.	ditto	9 by 7 . .	9	0
7.	ditto	10 by 8 . .	10	6
8.	ditto	12 by 10 . .	11	6

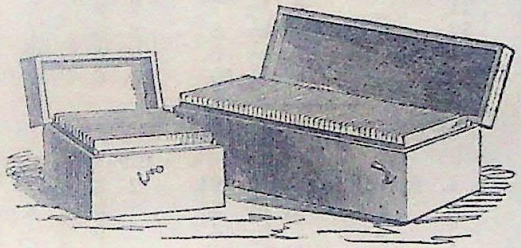

Fig. 80.

PLATE BOXES (*Fig.* 80).

For holding Glass Plates, in White Wood.

			For 12 Plates.		24 Plates.		50 Plates.	
			s.	d.	s	d.	s.	d.
No. 1.	for plates	$3\frac{1}{4}$ by $2\frac{3}{4}$	1	9	2	9	4	0
2.	,,	$4\frac{1}{4}$ by $3\frac{1}{4}$	2	3	3	3	4	6
3.	,,	5 by 4	2	9	3	6	5	6
4.	,,	$6\frac{1}{2}$ by $4\frac{3}{4}$	3	3	4	0	6	6
5.	,,	$6\frac{3}{4}$ by $3\frac{1}{4}$	3	3	4	0	6	6
6.	,,	6 by 5	3	3	4	0	6	6
7.	,,	7 by 6	3	9	4	6	7	6
8.	,,	$8\frac{1}{2}$ by $6\frac{1}{2}$	4	0	5	0	8	0
9.	,,	$7\frac{3}{4}$ by $4\frac{1}{4}$	3	9	4	6	7	6
10.	,,	$7\frac{1}{4}$ by $4\frac{1}{2}$	3	9	4	6	7	6
11.	,,	9 by 7	4	3	5	6	8	6
12.	,,	10 by 8	4	9	6	6	9	6
13.	,,	11 by 9	5	6	7	0	10	6
14.	,,	12 by 10	6	3	7	9	12	6
15.	,,	13 by 11	7	0	9	0	14	0
16.	,,	15 by 12	8	0	11	0	16	0
17.	,,	16 by 13	9	0	12	0	18	0

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PLATE BOXES (*Fig.* 80),

In Mahogany.

			12 Plates.		24 Plates.	
			s.	*d.*	*s.*	*d.*
No. 1.	for plates	3¼ by 2¾	3	6	4	6
2.	„	4¼ by 3¾	4	0	5	0
3.	„	5 by 4	4	6	6	0
4.	„	6½ by 4¾	5	3	7	6
5.	„	6 by 5	5	3	7	6
6.	„	6¾ by 3¼	5	3	7	6
7.	„	7 by 6	5	6	8	0
8.	„	7¼ by 4½	5	6	8	0
9.	„	7¾ by 4¼	5	6	8	0
10.	„	8½ by 6½	6	3	8	6
11,	„	9 by 7	7	0	9	0
12.	„	10 by 8	8	0	10	0
13.	„	11 by 9	9	6	12	0
14.	„	12 by 10	10	6	13	0

PLATE BOXES IN METAL.

			12 Plates.		24 Plates.	
No. 1.	for plates	3¼ by 2¾	2	3	3	9
2.	„	4¼ by 3¼	2	6	4	6
3.	„	5 by 4	2	9	5	0
4.	„	6½ by 4¾	3	0	5	6
5.	„	6 by 5	3	0	5	6
6.	„	6¾ by 3¼	2	6	4	6
7.	„	7 by 6	3	9	6	6
8.	„	7¾ by 4¼	3	9	6	6
9.	„	7¼ by 4½	3	9	6	6
10.	„	8½ by 6½	5	0	9	0
11.	„	9 by 7	6	0	10	6
12.	„	10 by 8	7	0	13	0
13.	„	11 by 9	8	0	14	6
14.	„	12 by 10	9	6	16	0

DRAINING BOXES.

New plate draining boxes for wet negatives, fitted with gutta-percha grooves and india-rubber cushions, to protect the negatives from injury during carriage, with draining chamber at bottom.

			s.	*d.*
No. 1.	for 1 doz. plates	6¾ by 3¼ . .	7	6
2.	„	6½ by 4¾ . .	7	6
3.	„	8½ by 6½ . .	10	0
4.	„	9 by 7 . .	11	0
5.	„	10 by 8 . .	12	0

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PATENT PLATE GLASS FOR COLLODION PICTURES,

Free from Specks, and with Edges roughed.

The great discrepancy in prices of glass plates between this and former quotations, is in consequence of the manufacturers having recently greatly advanced their prices.

	Per Dozen. s. d.		Per Dozen. s. d.
Size 3¼ by 2¾	1 0	Size 7¾ by 4¼	5 0
4¼ by 3¼	2 0	7½ by 4½	5 0
5 by 4	2 9	8½ by 6½	8 6
6½ by 4¾	4 6	9 by 7	10 0
6 by	4 6	10 by 8	13 6
6¾ by 3¼	3 3	11 by 9	16 0
7 by 6	5 9	12 by 10	21 0

EXTRA WHITE PATENT PLATE.

	Per Dozen.		Per Dozen.
Size 2½ by 2	0 8	Size 6¾ by 3½	4 0
3¼ by 2¾	1 2	6½ by 4¾	5 6
4¼ by 3¼	2 3	6 by 5	5 6
5 by 4	3 6	8½ by 6½	10 0

BEST POLISHED CROWN GLASS,

Or Crystal Sheet.

	Per Dozen.		Per Dozen.
Size 2½ by 2	0 3	Size 6¾ by 3½	1 3
3¼ by 2¾	0 5	6½ by 4¾	1 6
4¼ by 3¼	0 8	6 by 5	1 6
5 by 4	1 0	8½ by 6½	3 3

BEST OPAL GLASS.

	Per Dozen.		Per Dozen.
Size 2½ by 2	0 10	Size 6¾ by 3½	5 6
3¼ by 2	2 0	6½ by 4¾	7 0
4¼ by 3¼	3 0	6 by 5	7 0
5 by 4	4 6	8½ by 6½	14 0

Diamonds for cutting glass plates, best patent kind, 16s. and 18s. each.

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CRYSTAL MEDIUM,

Sold in Packets of Fifty, with Directions for Use.

		s.	d.
Packet of fifty sheets	1 by 1 inch	2	0
ditto	2½ by 2 „	3	6
ditto	3¼ by 2¾ „	7	6

TRANSFER CLOTH,

In packets of one dozen	2½ by 2 inch	0	6
ditto	3¼ by 2¾ „	0	9
ditto	4¼ by 3¼ „	1	0
ditto	6¾ by 3¼ „	1	6
Or per yard		3	0

PHOTOGRAPHIC PAPERS.

As much of the success of the Calotype, waxed paper, and other paper processes, depends on the nature of the material on which the sensitive compound is spread, a careful selection of papers from the most eminent makers has been made, combining fineness of surface and evenness of texture, with a proper tenacity to allow of the necessary washings to which the paper is exposed in the various manipulations.

Foreign Papers. (Per Quire.)

		s.	d.
Canson's Paper, size 22½ by 17½	Negative	2	9
Do. do.	Positive	3	0
Papier Saxe, size 22½ by 17½	Negative	3	6
Do. do.	Positive	4	0
Papier Le Rive, size 22½ by 17½	Negative	3	6
Do. do.	Positive	4	0

English Papers. (Per Quire.)

Hollingworth's Paper, thin, size 22 by 18	Negative	4	0
Do. do. do.	Positive	4	0
Whatman's do. 19 by 15	Negative	3	0
Do. do. do.	Positive	2	6
Towgood's do. 19 by 15	Negative	2	6
Do. do. do.	Positive	2	6
Do. do. 51 by 33	for Solar Camera	16	0
Turner's Paper, Small, size 15 by 9½	Negative	3	0
Do. Large 19 by 15	„	6	0
Do. Extra large 24 by 19	„	10	0
Do. Small 15 by 9½	Positive	1	3
Do. Large 19 by 15	„	2	6

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Filtering Papers. (Per Quire.)

	s.	d.
White Filtering Paper, free from iron or other impurities	1	0
Ditto, ditto, extra thick	1	6
Swedish Filtering Paper	4	0
Papier Joseph	1	0

Bland and Co.'s Prepared Papers,

Prepared with great Care.

	£	s.	d.	
Bland and Co.'s Waxed Paper for Negatives, size 17½ by 11½	0	7	0	per quire.
Bland and Co.'s ditto . size 22½ by 17½	0	14	0	„
Bland and Co.'s Iodized Waxed Papers, size 17½ by 11½	0	15	0	„
Bland and Co.'s ditto . . 22½ by 17½	1	10	0	„
Bland and Co.'s Iodized Calotype Paper, size 7 by 6	0	2	6	per doz.
Bland and Co.'s ditto . . 9½ by 7½	0	4	0	„
Bland and Co.'s ditto . . 10 by 8	0	6	0	„
Bland and Co.'s ditto . . 15 by 12	0	9	0	„
Bland and Co.'s Positive Papers, salted with Chloride of Sodium . 22½ by 17½	0	6	6	per quire.
Ditto, with Chloride of Barium 22½ by 17½	0	6	0	„
Ditto, ditto Chloride of Ammonium	0	6	0	„

Albumenized Papers.

The *superior excellence* of the Albumenized Papers, prepared and sold by Bland and Co., is acknowledged by their customers both at home and abroad, and is beyond dispute.

	Per quire. s.	d.
Bland and Co.'s thin Negative Saxe Extra Albumenized paper, for Stereoscopic or Carte de Visite pictures, size 22½ by 17½	12	0
Bland and Co.'s thin Negative Rive Extra Albumenized paper, for Carte de Visite or Stereoscopic pictures, size 22 by 17	12	0
Bland and Co.'s Medium Positive Saxe Extra Albuminized paper, for Stereoscopic or Carte de Visite pictures, size 22½ by 17½	12	0
Bland and Co.'s slightly Albumenized Positive Saxe paper, size 22½ by 17½	6	0
Bland and Co.'s highly Albumenized Positive thick Saxe paper, for small or large pictures, size 22½ by 17½	10	0
Bland and Co.'s highly Albumenized Medium Positive Rive paper, for small or large pictures, size 22 by 17	10	0

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WOOD BOARDS,

For attaching Paper to whilst Spreading on Solutions.

			s.	d.
No. 1.	for paper	7 by 6	0	9
2.	„	9 by 7	1	0
3.	„	10 by 8	1	6
4.	„	11 by 9	2	0

Glass Rods, for spreading solutions on to paper, each 3d., 4d., 6d., and 1s.

CAMEL HAIR BRUSHES,

For spreading Solutions on to Paper, made without Metal Binding.

	s.	d.		s.	d.
1½ inches broad, each	1	6	3 inches broad, each	2	6
2 „ „	1	9	4 „ „	3	6
2½ „ „	2	3	5 „ „	4	6

Thick round ditto, each 1s. and 1s. 6d.

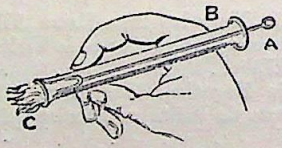

Fig. 81.

Buckle's Brushes (*Fig.* 81), for spreading solutions; each 1s. 6d. Glass tube, B; silver wire hook, A, which draws a piece of wool partly through the tube at C.

Wood Clips, for suspending sheets of paper, 1s. per doz.

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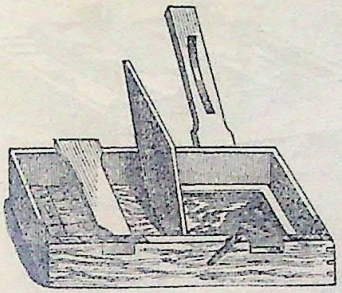

Fig. 82.

REVERSING OR PRINTING FRAMES.

These frames are so constructed that a uniform pressure may be obtained, thus ensuring perfect contact between the positive paper and negative plate. The back boards of these frames are so arranged that the progress of the picture may be watched without danger of shifting the papers.

BLAND AND CO.'S IMPROVED PRESSURE FRAMES (*Fig.* 82),

With jointed backs for examination whilst printing, in Oak or French-polished Mahogany, of best kind and make.

			Oak.				Mahogany.		
			£	*s.*	*d.*		£	*s.*	*d.*
No. 1.	size of glass	9 by 7 ...	0	11	6	...	0	13	6
2.	„	10 by 8 ...	0	13	0	...	0	16	0
3.	„	11 by 9 ...	0	15	0	...	0	17	6
4.	„	12 by 10 ...	0	16	6	...	0	19	0
5.	„	13 by 11 ...	0	18	6	...	1	1	0
6.	„	14 by 12 ...	1	1	0	...	1	5	0
7.	„	16 by 13 ...	1	5	0	...	1	10	0
8.	„	19 by 17 ...	1	10	0	...	1	18	0
9.	„	25 by 23 ...	2	5	0	...	2	15	0

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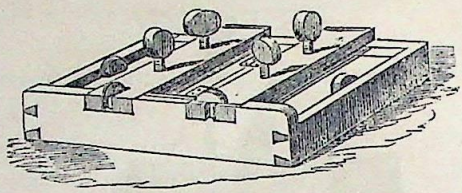

Fig. 83.

PRESSURE FRAMES,

Of Common Kind and Make, with Screws or Springs and Hinged Backboard (*Fig.* 83).

			EACH. £	s.	d.
No. 1.	for pictures,	7 by 6 . . .	0	7	6
2.	„	9 by 7 . . .	0	9	6
3.	„	10 by 8 . . .	0	12	0
4.	„	12 by 10 . . .	0	16	6
5.	„	14 by 12 . . .	1	1	0

PRESSURE FRAMES,

In White Wood, Common Kind, with Hinged Backs.

			EACH. £	s.	d.
No. 1.	for plates,	4¼ by 3¼ . . .	0	4	6
2.	„	6½ by 4¾ . . .	0	6	6
3.	„	8½ by 6½ . . .	0	8	6
4.	„	9 by 7 . . .	0	8	6
5.	„	12 by 10 . . .	0	14	0
6.	„	14 by 12 . . .	0	17	6
7.	„	16 by 14 . . .	0	19	0
8.	„	18 by 16 . . .	1	1	0
9.	„	22 by 18 . . .	1	8	6
10.	„	Stereoscopic . . .	0	4	6

Commonest form of Stereoscopic Printing frame, 2s.

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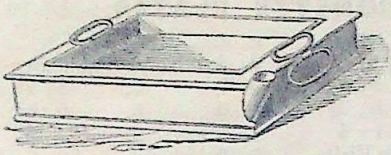

Fig. 84.

	£	s.	d.
Double Zinc Dish for Waxing Paper (*Fig.* 84), very convenient	0	10	0
Ditto, ditto, with plated inner dish	1	1	0

Horn Forceps, for manipulating with waxed or other paper (*Fig.* 85), 9d. each

Fig. 85.

Boxwood Forceps, (*Fig.* 85), for same purpose, each 6d.

Silver Wire Hooks, for lifting sensitive plates from dishes, from 1s. each.

VIGNETTE PLATES,

For Portraits or Landscapes. (*Fig.* 86.)

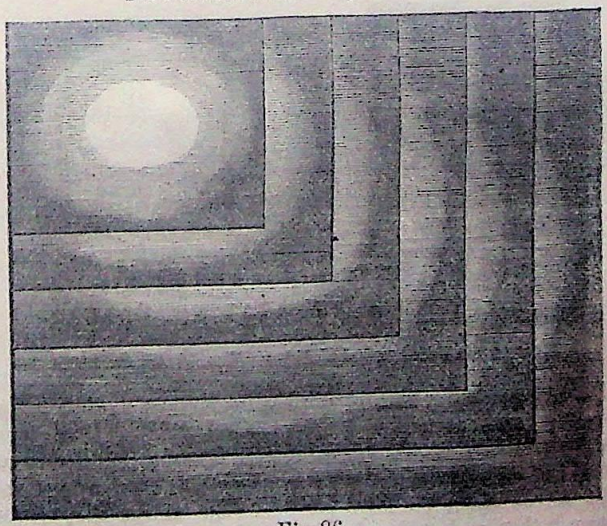

Fig. 86.

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VIGNETTE PLATES.—(*Fig.* 86.)

		s.	d.			s.	d.
No. 1.	size 2½ by 2 each	0	6	No. 6.	size 6½ by 4¾ ea.	1	10
2.	„ 3¼ by 2¾ „	0	9	7.	„ 8½ by 6½ „	2	2
3.	„ 4¼ by 3¼ „	1	0	8.	„ 9 by 7 „	2	6
4.	„ 5 by 4 „	1	6	9.	„ 10 by 8 „	3	0
5.	Carte de Visite „	1	0	10.	„ 12 by 10 „	4	6

Double for stereoscopic pictures, each 2s. 4d.

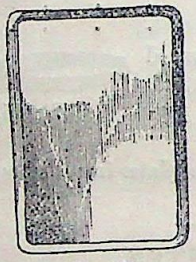

Fig. 87.

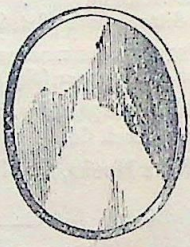

Fig. 88.

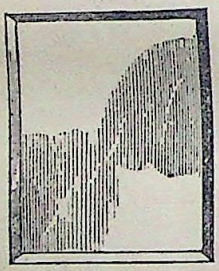

Fig. 89.

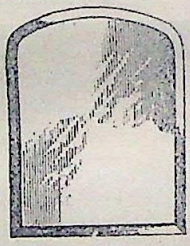

Fig. 90.

GLASS CUTTING OR SHAPING PLATES,

With Bevelled and Polished Edges (*Figs.* 87, 88, 89, 90).

These plates are for placing over the positive paper prints before mounting, and are of four patterns—Oval, Square, Dome, and Cushion (*Figs.* 87, 88, 89, 90), being held firmly on to the picture. When the best position of the picture is obtained, a sharp-pointed knife is run along the outer-polished edge of the shape; the picture is then ready to be placed on card-board.

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		s.	d.
No. 1.	for pictures 2½ by 2 each . .	0	6
2.	„ 3¼ by 2¾ „ . .	0	6
3.	„ 4¼ by 3¼ „ . .	0	9
4.	„ 5 by 4 „ . .	1	0
5.	„ 6½ by 4¾ „ . .	1	4
6.	„ 8½ by 6½ „ . .	1	6
7.	„ 10 by 8 „ . .	2	3
8.	Carte de Visite . . , . .	0	9

*** The above prices are the same for any shape, as in figures above.

Cutting-knives for using with above, each, 1s.

Fig. 91.

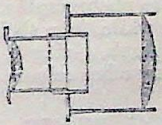

Fig. 92.

	£	s.	d.
Photographic Visuometer (*Fig.* 91), for enabling the tourist to judge of the effect of a landscape, folding for the pocket . . . . . 3s. 6d. and	0	4	6
Focussing Glass or Eye-piece, for obtaining a perfectly sharp and distinct picture on the focussing screen (*Fig.* 92) . . . . . 7s. 6d. and	0	10	0
Instrument to count Seconds, with Alarum . . .	2	5	0
Ditto, ditto, without Alarum	1	1	0

PHOTOGRAPHIC COLOURS,

For Colouring Photographs on Plate or Collodion.

No. 1.	Box, containing 7 colours, with gold and silver shells, brushes, &c.	0	6	0
No. 2.	Ditto, containing 14 colours, gold and silver shells, and an assortment of brushes . .	0	8	0
No. 3.	Ditto, containing 21 colours, ditto . . .	0	12	0

Elastic Bottle for removing dust from plate, No. 1, 2s.; No. 2, 2s. 9d.; No. 3, 3s. 6d.

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NEWMAN'S

INSTRUCTIONS FOR COLOURING PHOTOGRAPHS

IN

Oil Colours, Water Colours, Photographic Colours, &c.

WITH VALUABLE INFORMATION ON COLOURING, SIZING, VARNISHING, ETC. ETC.

FOURTH EDITION, BOUND IN CLOTH, PRICE 2s. 6D.

NEWMAN'S PHOTOGRAPHIC COLOURS
(POWDER).

These colours are prepared by a *peculiar process*, meeting every want of the photographer. They adhere with ease and fulness to the plate; while, from their transparency, *they colour without hiding* the photograph, giving a pure, brilliant, *life-like effect*, unattainable by any other colours.

THE SILVER DAGUERREOTYPE PLATE, THE GLASS COLLODION PLATE, PORTRAITS, LANDSCAPES, &c., TAKEN ON THE PAPER.

THE FOLLOWING ARE SOME OF THE PRINCIPAL COLOURS:—

Flesh, Fair, 1 2	Golden Yellow	Satin White
Ditto, Dark, 1 2	Distance	3 Greys
Carmine	Peach	Silver Grey
Carnation	White	3 Browns
Horizon	Black	Rose
Lavender	3 Blues	Permanent Scarlet
Crimson	4 Greens	Claret
Plum	Orange	White (Solarization)
3 Complexions	Pink	Background
Lips	Puce	&c., &c., &c.
3 Yellows	Damask	

In Small Bottles, sealed and tied over, price 1s. each.

Newman's Positive Colouring Varnish, 1s. and 1s. 6d. per Bottle.

Newman's Positive Colouring Varnish, for Non-Inverted Positives, 1s. and 1s. 6d. per Bottle.

Newman's Preparation, for Sizing Salted and Albumenized Paper, 1s. and 1s. 6d. per Bottle.

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PHOTOGRAPHIC BRUSHES.

		s.	d.
Nos. 1 and 2, Small Camel Hair	per dozen	1	6
Ditto, No. 3.	„	2	0
Sables in Quill	each 4d., 6d., to	1	0
Miniature Brushes	per dozen	4	0
Sables in Albata, very fine	„ 4s. to	6	0
Camel Hair Dusters	each	0	3
Round Camel Hair, for Chemicals	6d., 9d., and	1	0
Ditto, with silver wire	each	1	6
Flat Brushes, for Chemicals	up to 4 inches, per inch	0	9
Ditto, in tufts	4 inches, per inch	1	0
Ditto, 6 Quills in handle	each	1	6
Ditto, ditto, large	„	2	0
Ditto, in Tin, half to six inches	at per inch	0	9
Round Camel Hair in Tin	each 4d. to	2	6

(ALL POLISHED HANDLES.)

Stumps	each 4d. and	0	6
Gold Shells	each 6d. and	1	0
Silver or Alumina Shells	each	0	6

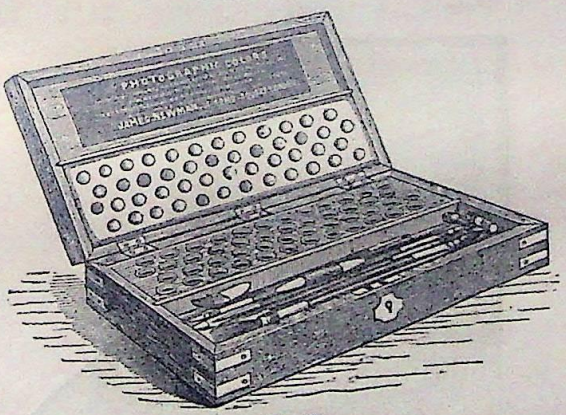

Fig. 93.

		£	s.	d.
Lock Mahogany Box, with Velvet Palette, Brushes, Stumps, Shells, &c.	36 Colours	2	2	0
Ditto	24 „	1	11	6
Ditto	18 „	1	5	0
Ditto	12 „	1	0	0
Ditto	9 „	0	10	6

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	£	s.	d.
Slide Boxes, containing any number of Colours, with Brushes, Stumps, Shells, &c.			
Albata and Brass-bound Dove-tailed Mahogany Boxes, with extra reserve of Brushes, Stumps, &c., for hot climates, from	2	2	0

PHOTOGRAPHIC COLOURS.

SUPERFINE WATER COLOURS.

Newman's Mahogany Boxes, arranged with Extra Colours, especially for Photographic Portraiture, with Slabs, Sable & Camel Hair Brushes, &c.

			s.	d.	s.	d.
Mahogany Slide Boxes,	12	Half-Cakes .	7	0	9	0
Ditto	18	„ .	10	6	13	0
Ditto	24	„ .	14	0	18	0
Ditto	12	Whole Cakes .	12	0	16	0
Ditto	18	„ .	20	0	24	0
Ditto	24	„ .	24	0	30	0

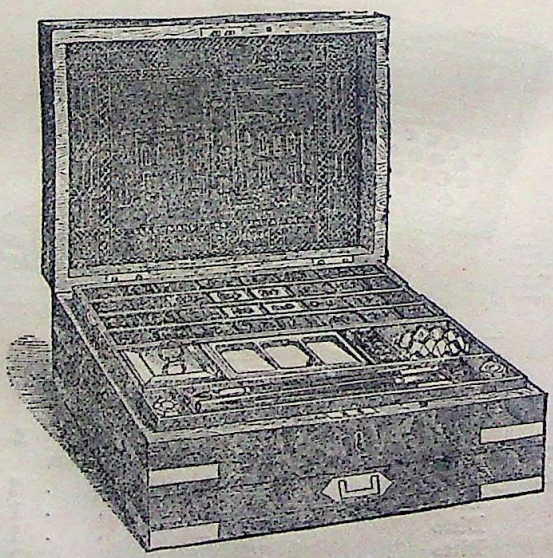

Fig. 94.

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			s.	d.	s.	d.
Mahogany Lock Box, with Sable and Camel Hair Brushes, Slabs, &c.	12 Half-Cakes	.	10	6	12	6
Ditto	18 „	.	14	0	18	0
Ditto	24 „	.	18	0	25	0
Ditto	12 Whole Cakes	.	16	0	20	0
Ditto	18 „	.	22	0	28	0
Ditto	24 „	.	31	6	42	0
Handsome Best Box, with Water Glasses, Sable, and Camel Hair Pencils, Drawer, Slabs, Body-Colour, and	12 Cakes	.	31	6	35	0
Ditto	18 „	.	40	0	48	0
Ditto	24 „	.	45	0	63	0

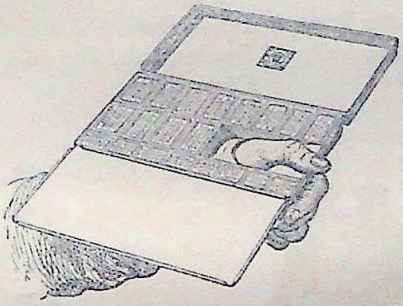

Fig. 95.

MOIST WATER COLOURS.

Japanned Box, with selected list of the Improved Moist Colours for Photographic portraiture, and Brushes	10 Half-Cups	.	10	6	12	6
Ditto	12 „	.	12	0	15	0
Ditto	16 „	.	15	0	20	0
Ditto	18 „	.	17	0	22	0
Ditto	10 Whole Cups	.	15	0	20	0
Ditto	12 „	.	18	0	25	0
Ditto	16 „	.	25	0	35	0
Ditto	18 „	.	31	6	40	0

The higher prices in the second column are for extra and more expensive but necessary Colours and Brushes.

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OIL COLOURS.

Boxes, with Oil Colours, especially selected for Photographic Portraiture, with Palette, Sable & Hog-Hair Brushes, Oils, Varnishes, Palette Knife, Softener, &c.

		£	s.	d.
Japanned Boxes, with folding Palette, Brushes, &c.				
Varnishes, Oils, &c., &c.	12 Tubes . . .	1	8	0
Ditto long	12 „ . . .	1	8	0
Ditto	16 „ . . .	1	15	0
Ditto	20 „ . . .	2	6	0
Ditto	27 „ . . .	3	10	0
Ditto	30 „ and Double			
Bottom for Millboards, *very complete* .		4	4	0

The larger the Boxes, in Oil or Water Colours, the more complete the selection of Brushes, Oils, Varnishes, Slabs, Dippers, &c.

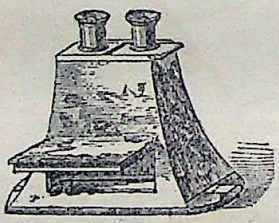

Fig. 96.

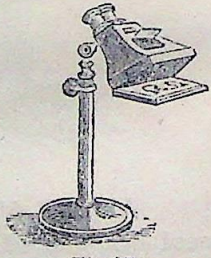

Fig. 97.

STEREOSCOPES AND STEREOSCOPIC PICTURES.

Stereoscopes are of two kinds, namely, the Reflecting Stereoscope of Professor Wheatstone (*Fig.* 98), and the Lenticular or refracting one of Sir David Brewster (*Figs.* 96 & 99). They both possess the power, as their name implies, of exhibiting objects properly prepared as solids; that is to say, precisely as we see them in nature, having three dimensions—length, breadth, and thickness.

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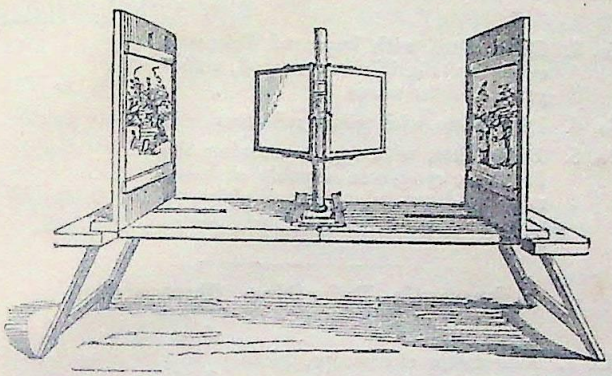
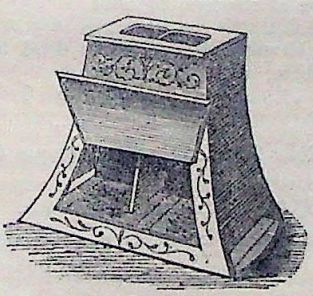


(*Fig.* 98.)

The Reflecting Stereoscope (*Fig.* 98) is best adapted to the display of large pictures and views; while the Lenticular one is most suited for the exhibition of portraits, architectural subjects, still life, groups of statuary, and such objects which do not suffer by being reduced to pictures of small size.

One of the most beautiful applications of photography is, the taking of pictures fitted for the Stereoscope; in fact, this is the only really correct means by which we can obtain them.

Reflecting Stereoscope for large views (*Fig.* 98) £3 3s. & £4 4s.



(*Fig.* 99.)

		s.	d.		s.	d.
No. 1.	Refracting stereoscope in japanned tin				2	6
No. 2.	Ditto, ditto (Fig. 96) in mahogany or rosewood	5	0	to	7	6

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		s.	d.		s.	d.
No. 3.	Ditto, ditto, with improved Prismatic eye-pieces (Fig. 99), in rosewood, mahogany, or other woods	7	6	to	21	0
No. 4.	Ditto, ditto, with mirror reflectors .	10	0	to	25	0
No. 5.	Ditto, ditto, with top, containing the Prismatic eye-pieces, capable of being raised or depressed, to suit all sights .	16	0	to	30	0

Stands for stereoscopes, as per Fig. 97, from 12s. each.

Achromatic Refracting Stereoscopes.

		£	s.	d.		£	s.	d.
No. 1.	Achromatic stereoscope, plain mounting.	1	15	0	and	2	0	0
No. 2.	Ditto, ditto, ornamental wood or leather	2	2	0	and	2	10	0
No. 3.	Ditto, ditto, plain mounting and stand	2	12	6	and	3	3	0
No. 4.	Ditto, ditto, ornamental wood and stand	3	3	0	and	4	4	0

Patent Revolving or Magazine Stereoscopes.

		£	s.	d.		£	s.	d.
No. 1.	Magazine stereoscope, to hold and exhibit 25 transparent glass, or 50 paper slides . .	4	4	0	to	8	8	0
No. 2.	Ditto, ditto, with achromatic lenses	5	5	0	to	10	10	0

Stereoscopic slides for refracting stereoscopes, 9d., 1s., and 1s. 6d. each.

Ditto, on glass, 4s. 6d., 6s., and 7s. 6d. each.

Large views on paper, for reflecting stereoscope, from per pair, 7s. 6d.

CARTE DE VISITE ALBUMS.

Albums for holding Carte de Visite pictures in a variety of mounting, and beautifully bound and finished, of sizes to contain 10, 25, 50, 80, and 100 pictures, price, according to number to contain and finish, from 5s. to 25s.

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BACKGROUNDS FOR THE OPERATING ROOM,

Of great variety of Design, and of Sizes suited for the Room, artistically Painted.

		£	s.	d.		£	s.	d.
Size,	6 by 4 feet. . .	1	5	0	to	2	2	0
„	7 by 6 „ . .	2	2	0	to	3	3	0

WADDY'S ROLLING MACHINES OR PRESSES,

SUPPLIED BY

BLAND & CO.,

153, Fleet Street, London, E.C.

It is curious to observe how completely the public opinion has changed with regard to the subject of Photography. At first, merely considered as a curiosity, or an interesting, but comparatively valueless, application of scientific chemistry, it has now won its way to a high rank in the Fine Arts. Photography will never again be consigned to an attic in International Exhibitions; for the artist who works with a Camera is now acknowledged to be a legitimate successor of Raffaelle, Rubens, or Turner, as truly as his brother, who wields the pencil or brush.

It may be doubted whether this art is not destined to prove the great educator of the day: for the rapid strides towards perfection made by its professors, and the wide-spread "rage" for their productions which keeps them all so well employed, bespeak for it a distinguished future.

"No home without a Stereoscope" has long been the statement of an admitted maxim. "No home without a Photographic Album" is quickly becoming equally true; and the competition consequent on so immense a production as has become necessary to supply the demand, has elicited the very best results. The tone, delicacy, and finish which photographers now obtain were not conceived possible a year or two ago, and no *charlatan*, no careless or unskilful performer, can hope to hold his position for a day against those whose science and manipulation leave nothing to be desired.

The photographer, however, is very much at the mercy of his own apparatus. Without the very best appliances, even the most practised hand will fail to secure the highest success; and several articles, formerly *de luxe*, have now become indispensable.

This is the case with the Rolling Machine, or Calender, the object of which is twofold. A *good* roller (for a bad one is perfectly useless) gives to the picture a beautiful glacé finish, imparting an effect equal in every respect to the application of varnish to a painting. Moreover, it brings out details not previously visible;

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and many of the most delicate lines, which add the deepest beauty to a picture, are altogether lost unless the ROLLING MACHINE be used.

In the words of the PHOTOGRAPHIC NEWS of the 14th March, 1862, and the PHOTOGRAPHIC TIMES of the 1st of June, 1862 (from which many of these remarks are borrowed):—

"Until the trial is actually made, it is difficult to believe the difference in a print which can be produced by the mere change of surface. Of course, this improvement in appearance results from rolling by any good machine, possessing a perfectly burnished plate, and giving a very powerful pressure."

"This rolling and finishing is now absolutely necessary to render a print marketable, and fit for competition; and it is only right our readers should know which of the many now offered to photographers is the BEST, MOST EFFICIENT, and CHEAPEST."

These observations are applicable to all photographs, but especially to *cartes de visite*, and portraits generally; the "character" and "expression" of the countenance frequently depending altogether on those extremely delicate lines and finely-toned shades, which cannot be traced till the ROLLING MACHINE has done its work.

It will be obvious that, in a matter of such vital importance, no photographer can afford to have an inferior article, while no purchaser wishes to give an extravagant price even for a good one. The machines made by I. D. WADDY are at the same time perfect in material, exquisite in workmanship, and moderate in price. A steel plate, very highly polished, is passed, by the action of cog-wheels, between two cylinders, which are approximated by means of regulating screws so as to secure immense power of compression.

Directions for their use, and for their more perfect preservation from accident, or injury, are given by the maker with every machine. We feel that we can confidently recommend these Improved Rolling Machines, because every thing is done to ensure their excellence. Made by experienced workmen, from the most perfect materials, under the eye of the manufacturer, who has introduced all the latest improvements, and yet has retained that simplicity of construction so indispensable to regular and hard work, and carefully tested before they are allowed to leave the factory, may safely bear the guarantee which the maker invariably supplies.

At the same time, the prices are remarkably low, and could not, indeed, have been fixed at such a moderate figure, if Mr. Waddy had not possessed great advantages in the extensive works at which these machines are made. Artists in all parts of the world, therefore, may rely that these neat and compact, but strong and perfect, little rollers, will travel with perfect safety, and will do their work in such a style as to afford the purchaser the satisfaction of beholding the realization of his brightest hopes.

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PARTICULARS, SIZES, AND PRICES OF

WADDY'S ROLLING MACHINES & PRESSES.

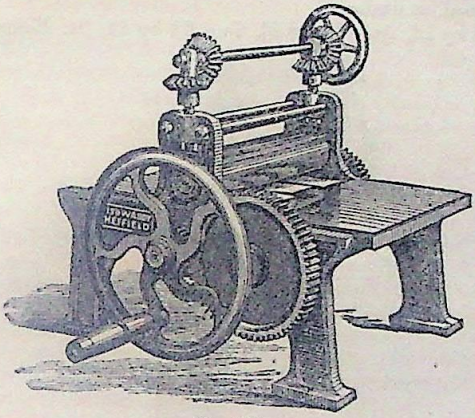

Fig. 100.

DOUBLE GEARED MACHINE, WITH FLY WHEEL AND CONNECTED PRESSURE SCREWS.

Size of Plate 18×12, £7; 21×15, £8 15s.; 24×18, £11. (*Fig.* 100.)

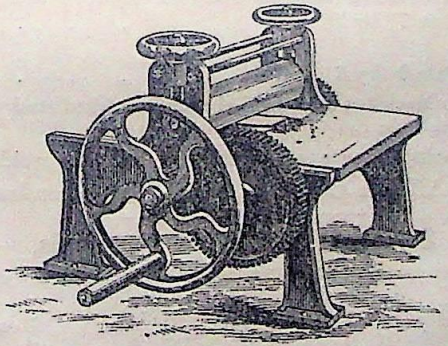

Fig. 101.

DOUBLE GEARED AND FLY WHEEL.

This is the Machine for which there is the largest demand.
Size of Plate 18×12, £5 5s.; 21×15. £7; 24×18, £9. (*Fig.* 101.)

SINGLE GEAR MACHINE.

Size of Plate 18×12, £4 15s; 21×15, £6 6; 24×18, £8 5s.

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All the above Machines are supplied with burnished steel plates and mahogany boards.

Metal tables, planed on both sides, may be had, if preferred, in place of wood, as under :—

18 by 12, 5s.—21 by 15, 7s.—24 by 18, 9s. Extra.

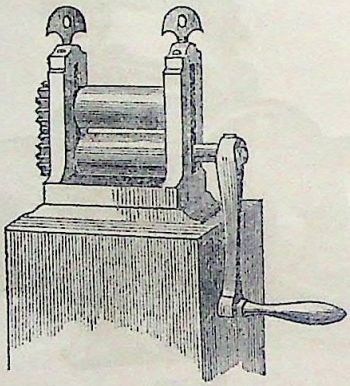

Fig. 102.

	£	s.	d.
SMALL MACHINE FOR CARTES DE VISITE (*Fig.* 102).			
Rollers two inches in diameter and four inches long .	1	10	0
SMALL MACHINE FOR CARTES DE VISITE (*Fig.* 102), BUT WITH PLATE.			
Size of Plate 7¼ by 3¼	1	15	0
AMATEUR'S MACHINE.			
Size of Plate 9 by 6	2	15	0

These two Machines are supplied with burnished steel plate and planed metal table.

*** In ordering, be sure to give the price, and thus avoid mistake.

BLAND & CO., 153, Fleet Street, London.

Stoppered Bottles for Chemicals.

Green Glass (narrow mouth).	s.	d.	White Glass (narrow mouth).	s.	d.	White Glass (wide mouth).	s.	d.
5 oz. capacity	0	5	1 oz.	0	4	1 oz,	0	5
10 ,,	0	6	2	0	6	2	0	7
15 ,,	0	7	4	0	8	4	0	9
20 ,,	0	8	5	0	9	8	0	11
40 ,,	0	10	10	0	10	10	1	0
80 ,,	1	0	20	1	3	20	1	6

Glass Carboy, for distilled water, to hold 2 gallons, bound with wicker work, 4s. 6d.

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PURE CHEMICALS AND PREPARATIONS

Used in the Photographic Processes.

		s.	d.
Acid, Acetic, Beaufoy's	per lb.	1	0
„ Glacial, for paper processes	per oz.	0	9
„ „ for Collodion	per lb. 5s., „	0	4
„ Citric	per lb. 4s., „	0	4
„ Formic	„	0	4
„ Gallic	„	1	3
„ Nitric, sp. gr. 1·450	per lb. 2s. „	0	2
„ Pyrogallic	per oz. 6s., per dram	0	10
„ Sulphuric	per lb.	0	3
„ pure	„	1	6
„ Tannic	per oz.	1	0
Alcohol	per pint 4s. „	0	3
„ Absolute, sp. gr. ·800	„ 7s. 6d. „	0	6
Ammonia, sp. gr. ·880	„ 1s. 6d. „	0	2
Ammonium, Bromide	„	2	6
„ Chloride	„	0	3
„ Iodide	„	2	6
Barium, Chloride	per lb. 2s. „	0	2
„ Iodide	„	3	0
Baryta, nitrate	per lb. 2s. „	0	2
Benzole	per pint	2	0
Bromine	per oz.	2	6
Cadmium, Bromide	„	3	0
„ Iodide	„	2	6
Calcium, Bromide	„	3	6
„ Iodide	„	3	6
Charcoal, Animal	„	3d. &	6
Chloroform	„	0	8
Collodions, Ponting's, see page 93			
„ Keene's „ 95			
„ Thomas's „ 96			
„ Ramsden's „ 94			
„ Bland and Co.'s, Negative	per pint	12	6
„ „ Positive	„	9	0
Cotton Wool	per oz.	0	3
Dextrine	per lb. 1s. 6d. „	0	2
Diamond Polish for cleaning plates	per bottle 6d. and	1	0
Æther, Sulphuric, sp. gr. ·724	per lb. 7s. per oz.	0	6
„ „ ·750	„ 6s. „	0	5
„ „ Methylated Spirit			
„ sp. gr. ·720	per lb. 3s. per oz.	0	3
Glycerine	„ 6s. „	0	6

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		s.	d.
Gold Chloride, in 15 gr. tubes	¼ dram, each	2	6
" "	½ "	4	6
" "	1 "	8	6
" "	and Soda, non-deliquescent, neutral, 15 grs.	2	6
"		1	6
Iodine, pure (variable)	per oz.	2	6
Iron Iodide	"	0	1
" Protosulphate	per lb. 1s. "	0	1
Kaolin (China Clay)	" 1s. "	0	2
Lead, Nitrate	"	0	3
Mercury, Distilled	per lb. 3s. 6d. "	0	5
" Bichloride	"	1	6
Naphtha	per pint	0	3
Potash, Bichromate	per oz.	0	1
" Nitrate	per lb. 1s. "	2	0
Potassium, Bromide	"	0	4
" Cyanide	in 1 lb. bottles, 4s. "	1	6
" Iodide	"	1	0
Plate Cleaning Solution	per bottle 6d. &		
Silver, Nitrate, see page 91.			
Soda, Acetate	per lb. 2s. per oz.	0	2
" Hyposulphite	per lb.	0	8
" Phosphate	per oz.	0	2
Sodium, Chloride	"	0	2
" Fluoride	"	1	0
Solution for Iodizing Waxed Paper	per pint	4	0
" rendering Waxed Paper sensitive	"	8	0
Sugar of Milk	per oz.	0	3
Tannin	"	1	0
Test Paper, Blue Litmus	per book	0	2
" Red	"	0	2
Tripoli	per oz.	0	3
Uranium, Nitrate	"	2	0
Varnish Amber in Chlorform	"	0	10
" Benzoin, see page 91	"	1	0
" Bristol Hard (Ponting's), see page 94, 5 oz. 1s. 6d. 10 oz. 2s. 6d.	per pint	4	6
" Crystal Varnish, see page 91, per pint, 4s.	per oz.	0	4
" Black Jet	per bottle 6d. &	1	0
" Newman's Positive Colouring see page 78	" 1s. &	2	6
" Newman's Penetrating, see page 78	" 1s. 6d. &	3	0
" Sohnèe Freres	"	2	0
Water, distilled	per gallon	0	8
White Wax	per lb.	3	0

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NITRATE OF SILVER.

These prices are for Cash only, which must accompany the order, as Credit cannot be given.

	Ordinary Commercial.	Fused.	Pure re-crystallized.
	s. d.	s. d.	s. d.
1 oz. and under 5	4 0 .	4 3 .	4 6
5 „ 10	3 9 .	4 0 .	4 3
10 „ 25	3 8 .	3 10 .	4 0
25 „ 50	3 7 .	3 9 .	3 10

	s.	d.
Nitrate of Silver Bath, prepared for Positive or Negative process, inclusive of bottles . . . per pint	7	6
Nitrate of Silver Bath, 60 grs. to the oz. of distilled water, for sensitizing albumenized paper . . . per oz.	0	7

BLAND & CO.'S

LIQUID JET,

FOR APPLYING TO THE BACK OF COLLODION POSITIVES.

GIVING GREAT BRILLIANCY AND LUSTRE TO THE PICTURES.

This peculiar Preparation is not liable to crack under any circumstances of age or exposure.

Price 6d. per 4-ounce bottle; 8-ounce ditto 1s.

BLAND & CO.'S

CRYSTAL VARNISH,

FOR POSITIVE PICTURES.

This preparation does not require the plate to be warmed; it dries in a few moments.—Price 4d. per ounce.

BLAND & CO.'S

BENZOIN VARNISH,

FOR PROTECTING THE FINISHED NEGATIVE.

1*s. per Ounce.*

This varnish does not require the plate to be warmed, but dries instantly, leaving a perfectly hard, transparent coating on the picture.

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DRY COLLODION PLATES,

BY DR. NORRIS'S PATENT PROCESS.

AGENTS,

BLAND & CO.,

OPTICIANS TO THE QUEEN,

153, Fleet Street, London, E. C.

PRICE LIST OF

DRY COLLODION PLATES.

DR. NORRIS'S PATENT PROCESS.

	£	s.	d.
4¼ by 3¼ inches, per dozen . . .	0	5	0
5 by 4 „ „ . . .	0	6	8
6½ by 4¾ „ „ . . .	0	10	0
6¾ by 3¼ „ „ . . .	0	8	9
7 by 6 „ „ . . .	0	14	0
8½ by 6½ „ „ . . .	0	18	0
9 by 7 „ „ . . .	1	1	0
10 by 8 „ „ . . .	1	6	8
12 by 10 „ „ . . .	2	0	0

PRICE LIST OF DR. NORRIS'S

NEGATIVE PORTRAIT AND RAPID LANDSCAPE PLATES.

4¼ by 3¼ inches, per dozen . . .	0	5	9
5 by 4 „ „ . . .	0	8	0
6¾ by 3¼ „ „ . . .	0	10	0
6½ by 4¾ „ „ . . .	0	11	6
7 by 6 „ „ . . .	0	16	0
8½ by 6½ „ „ . . .	1	1	0
9 by 7 „ „ . . .	1	3	6
10 by 8 „ „ . . .	1	10	6
11 by 9 „ „ . . .	1	18	0
12 by 10 „ „ . . .	2	6	0

All other Sizes to order, up to 36 by 24 inches.

The Plates are securely packed in Cases impervious to light or moisture. Every Package is accompanied with full and lucid directions for exposing, developing, fixing, &c.

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PONTING'S COLLODIONS,

FOR NEGATIVE AND POSITIVE PICTURES.

AGENTS FOR LONDON,

BLAND AND CO.,

OPTICIANS TO THE QUEEN,

153, Fleet Street, London, E.C.

PONTING'S UNCHANGEABLE COLLODIONS.

The Manufacturer has the gratification to announce that he has been awarded the **only Medal given for Collodion by the Jury of the International Exhibition,** thus endorsing the favourable opinion so long expressed by the Photographic Public.

Jurors' Reports, Class 14.

(No. 3043.) BLAND & Co., *as Wholesale Agents, exhibit the* only Collodion *to which a* MEDAL *was awarded, that of* Mr. PONTING, *of Bristol* (3136). *This Collodion, on trial by the* Jury, *fully bore out the reputation it has obtained amongst Practical Photographers, as extremely* rapid, *and giving very delicate details, full of* half tone *and* brilliancy. *The* stability *of this* Collodion *is a feature to which the* Jurors *call* especial attention. *At the period when the trial was made, the* Sensitive Collodion *had been prepared* many months; *and as some of the Members had been in the habit of using the same preparation, they were enabled by their individual experience to confirm and endorse the* results of the trial *then made, as to the* high character *for* SENSITIVENESS *and* STABILITY *of this* Collodion.

Ponting's Iodized Collodion for Negatives.

This preparation has been so many years before the public, and has met with such constantly increasing favour both at home and abroad, that it will be unnecessary to say anything about it.

Sold in stoppered bottles, 5 oz. 4s., 10 oz. 7s. 6d., 20 oz. 15s., 40 oz. 30s.

Ponting's Bromo-Iodized Collodion for Negatives.

Specially prepared for Instantaneous Pictures and for quick Portraiture.

This combination being made upon the same principles as the above, like it, retains its sentiveness for years, and is, probably, the most rapid in action of any yet introduced, producing very fine soft pictures, full of detail; and though it suffers under the disadvantage of requiring two developments, first with iron, and

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afterwards with pyrogallic, yet the important gain of a short exposure, together with the clean and easy working properties, imparted by the use of bromine, will no doubt make it a favourite, both with the professional man and the amateur.

Mr. H. P. Robinson, of Leamington, writes of this Collodion: "Your Bromo-Iodized Collodion is the best I have ever used; it will take intensity, which no other Bromo-Iodized Collodion ever would that I have used before."

This, likewise, answers admirably for dry plates. Prices and sizes same as above.

Ponting's Bromo-Iodized Collodion for Positives.

This, like the two foregoing preparations, is unchangeable. Possessing extreme rapidity, it produces first-class pictures of extreme delicacy and beauty, and has met with a large share of public favour.

Sold in corked bottles, 5 oz. 2s. 6d., 10 oz. 5s., 20 oz. 10s.

The manufacturer has now had nearly ten years of large experience in the preparation of Collodion, and can safely guarantee that these preparations possess in an eminent degree the highest qualities of good Collodion; while they are rich in cotton, they likewise have a brightness and fluidity which produce a smooth and even film free from spots, of great strength and tenacity allowing the various operations connected with the production of a picture to be conducted without fear of rupture of the film. To this must be added, the remarkable qualities of keeping indefinitely, combined with the highest degree of sensitiveness, properties possessed alone by Collodions of his manufacture.

Bristol Hard Varnish for Collodion Negatives.

This Varnish, the result of a number of careful experiments, extending over several years, is confidently recommended to photographers as both the best and cheapest of its kind. It stands the wear and tear of printing a large number of copies better than any other, and does not stick in the hottest sun.

Sold in bottles, 5 oz. 1s. 6d., 10 oz. 2s. 6d., 20 oz. 4s. 6d.

MANUFACTORY, 32, HIGH STREET, BRISTOL.

RAMSDEN'S COLLODIONS.

AGENTS,

BLAND & CO.,

PHOTOGRAPHIC INSTRUMENT MAKERS TO THE QUEEN.

153, Fleet Street, London, E.C.

Ramsden's New Negative Collodion, for Carte de Visite and Stereoscopic pictures, 4 oz. 2s. 6d., 10 oz. 5s. 6d., 20 oz. 11s.

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Ramsden's Positive Collodions, 2 oz. 1s., 4 oz. 2s., 10 oz. 5s. 6d., 20 oz. 11s.

BLAND & CO., 153, Fleet Street, London.

KEENE'S COLLODIONS.

AGENTS,

BLAND & CO.,

PHOTOGRAPHIC INSTRUMENT MAKERS TO THE QUEEN,

153, Fleet Street, London, E.C.

KEENE'S (original) FOTHERGILL OR DRY PROCESS COLLODION,

Universally acknowledged unequalled for all Preservative and Dry Processes; peculiarly adapted for use in hot climates, and an excellent Wet Process Collodion, particularly for Views and Copying purposes. This Collodion is so well known that further comment is considered unnecessary.—Pints (16 oz.), 11s. 6d.; half-pints, 6s.; quarter-pints, 3s. 6d., in separate solutions, or Iodized.

It may be used twelve or twenty-four hours after being Iodized, but will be found to work best for the Dry Processes a few weeks, and is by some preferred even months after.

Full directions for the Fothergill process are given with each bottle.

KEENE'S (Cadmium) WET PROCESS COLLODIONS

Are specially prepared for the Wet Process, and possess the following characteristics:—Extreme sensitiveness, uniformity, structureless film, extraordinary keeping properties, delicate detail without flatness, and vigour without harshness; and embrace all the requirements for Instantaneous, Carte de Visite, and Portrait and View purposes of every description. They consist of the Normal Collodion, with different Iodizers, to meet the varied requirements of Photographers, viz:—

CADMIUM IODIZED.—Highly sensitive, gives full intensity, and well adapted for use in dull weather, or with a good diffused light, where much contrast is desired.

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CADMIUM BROMO-IODIZED.—Giving more detail, and the best for general purposes, whether Instantaneous, Carte de Visite, or View. N.B. This is the Collodion supplied to agents, and recommended to amateurs, and those not requiring one of a special character; it works well under all circumstances, is very uniform, long keeping, and sensitive.

EXTRA BROMO-IODIZED.—Containing the Iodide and Bromide in equivalent proportions; more particularly adapted for View Photography, under extreme circumstances of light and heat, and other special purposes.

The Normal Collodion can also be had with usual, or any special Iodizer, and in separate solutions to order.—Price; same as Dry Process Collodion; and ⅛-size 1s. 10d. each.

KEENE'S EXTRA SENSITIVE (Bromo-Iodized)
POSITIVE COLLODION.

A first-class article at a moderate price, and should be in the hands of every Professional Photographer.—Two-oz. bottles 1s.; 4-oz. 2s.; 8-oz. 4s. each ready Iodized; and pints (16 oz.) separate solutions, 8s.

BLAND & CO., 153, Fleet Street, London.

THOMAS'S COLLODIONS.

AGENTS,

BLAND & CO.,

OPTICIANS TO THE QUEEN,

153, Fleet Street, London, E.C.

Thomas's Negative Collodion, with Potassium Iodizer, per pint 16s. ½-pint 8s. 6d., 4-oz. 4s.

Thomas's Negative Collodion, with Cadmium Iodizer, pints 16s., ½-pints 8s. 6d., 4-oz. 4s.

Thomas's Negative Collodion, with Bromo-Cadmium Iodizer, pints 16s., ½-pints 8s. 6d., 4-oz. 4s.

Thomas's Negative Collodion and Bromo-Potassium Iodizer, pints 16s., ½-pints 8s. 6d,, 4-oz. 4s.

Thomas's Positive Collodion and Iodizer, pints 16s., ½-pints 8s. 6d., 4-oz. 4s.

BLAND & CO., 153, Fleet Street, London.

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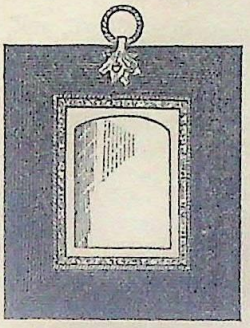

Fig. 103.

Fig. 104.

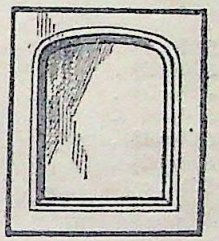

Fig. 105.

PASSE PARTOUTS.—(*Fig.* 105.)

No. 1.

Black or brown ground, bronze bevil, oval, dome, or cushion shape.

		£	s.	d.
2½ by 2 .	per doz.	0	1	6
3¼ by 2¾ .	„	0	2	0
4¼ by 3¼ .	„	0	2	6
5 by 4 .	„	0	4	6
6½ by 4¾ .	„	0	6	6
8½ by 6½ .	„	0	8	6

No. 2.

White ground, buff bevil, oval, dome, or cushion shape.

		£	s.	d.
2⅔ by 2 .	per doz.	0	2	0
3¼ by 2¾ .	„	0	2	10
4¼ by 3¼ .	„	0	3	9
5 by 4 .	„	0	6	0
6½ by 4¾ .	„	0	8	0
8½ by 6½ .	„	0	13	0

No. 3.

Porcelain bevil, dark ground, oval, dome, or cushion shape.

		£	s.	d.
2⅔ by 2 .	per doz.	0	2	6
3¼ by 2¾ .	„	0	3	0
4¼ by 3¼ .	„	0	3	9
5 by 4 .	„	0	5	9
6½ by 4¾ .	„	0	8	0
8½ by 6½ .	„	0	14	0

No. 4.

Gold ground, gold bevil, oval, dome, or cushion.

		£	s.	d.
2½ by 2 .	per doz.	0	4	6
3¼ by 2¾ .	„	0	5	6
4¼ by 3¼ .	„	0	7	0
5 by 4 .	„	0	12	0
6½ by 4¾ .	„	0	15	6
8½ by 6½ .	„	1	10	0

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No. 5.

Bristol board, smooth or rough, with extra large margin, white bevil, oval, dome, and cushion shape.

		£	s.	d.
2½ by 2 .	per doz.	0	2	9
3¼ by 2¾ .	„	0	4	0
4¼ by 3¼ .	„	0	5	0
5 by 4 .	„	0	7	0
6½ by 4¾ .	„	0	9	6
8½ by 6½ .	„	0	14	0
Ditto, extra	„	0	17	0

No. 6.

White ground, gold bevil, oval, dome, and cushion shape.

		£	s.	d.
2½ by 2 .	per doz.	0	1	6
3¼ by 2¾ .	„	0	2	3
4¼ by 3¼ .	„	0	2	9
5 by 4 .	„	0	4	6
6½ by 4¾ .	„	0	6	0
8½ by 6½ .	„	0	9	0

No. 7.

Tinted ground, two gold bevils, extra margin.

		£	s.	d.
2½ by 2 .	per doz.	0	8	0
3¼ by 2¾ .	„	0	8	6
4¼ by 3¼ .	„	0	10	0
5 by 4 .	„	0	13	6
6½ by 4¾ .	„	0	19	0
8½ by 6½ .	„	1	6	0

No. 8.

Bristol board, with extra large margin, tinted bevil, white ground, and tinted stamped rim.

		£	s.	d.
3¼ by 2¾ .	per doz.	0	7	6
4¼ by 3¼ .	„	0	9	6
5 by 4 .	„	0	14	0
6½ by 4¾ .	„	1	0	0
8½ by 6½ .	„	1	10	0
Ditto, extra	„	1	13	6

No. 9.

Tinted ground, gold bevil, and white embossed rim.

		£	s.	d.
3¼ by 2¾ .	per doz.	0	8	0
4¼ by 3¼ .	„	0	10	0
5 by 4 .	„	0	14	0
6½ by 4¾ .	„	1	0	0
8½ by 6½ .	„	1	10	0
Ditto, extra	„	1	14	0

No. 10.

White ground, gold bevil and fillet, and white embossed ground.

		£	s.	d.
3¼ by 2¾ .	per doz.	0	8	6
4¼ by 3¼ .	„	0	10	6
5 by 4 .	„	0	15	0
6½ by 4¾ .	„	1	1	0
8½ by 6½ .	„	1	11	6
Ditto, extra size	„	1	15	6

No. 11.

Bristol bevil, white ground, and white embossed rim.

		£	s.	d.
3¼ by 2¾ .	per doz.	0	7	6
4¼ by 3¼ .	„	0	9	6
5 by 4 .	„	0	14	0
6½ by 4¾ .	„	1	0	0
8½ by 6½ .	„	1	9	0
Ditto, extra size	„	1	13	0

No. 12.

Best London make, with glass gilt bevilled edge, extra lines, and bound with gold.

		£	s.	d.
3¼ by 2¾ .	per doz.	0	6	0
4¼ by 3¼ .	„	0	9	0
5 by 4 .	„	0	11	6
6½ by 4¾ .	„	0	16	6
8½ by 6½ .	„	1	2	6
9 by 7 .	„	1	12	6

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Stereoscopic Passe Partouts.

	£	s.	d.
Stereoscopic Passe-partouts, dark ground, and gold line for positives or negatives on glass, per dozen . .	0	4	0
Ditto, ditto, ornamental, per dozen . . 7s. and	0	9	0
Card Mounts for mounting Stereoscopic paper pictures, in packets of 3 dozen, assorted tints . . .	0	1	0
Enamelled Stereoscopic Card Mounts, per gross . .	0	6	6
Ditto, ditto, per dozen	0	0	8
Card Mounts, stout, for Carte de Visite pictures, per gross	0	12	0
Ditto, ditto, per dozen	0	1	6
Card Mounts for large Photographs :—			
Size 11½ by 9 per dozen	0	3	0
14½ by 10½ „	0	4	9
22 by 18½ „	0	11	0

ORMOLU FRAMES (*Fig.* 104),

With Mats, Glasses, and Rings.

	s.	d.
For pictures 2½ by 2 . . . each	0	10
„ 3¼ by 2¾ . . . „	1	3
„ 4½ by 3½ . . . „	1	8
„ 5 by 4 . . . „	2	3
„ 6½ by 4¾ . . . „	3	6

PAPIER MACHE FRAMES (*Fig.* 103),

With Dome, Oval, or Cushion Mats, Glasses, and Suspension Ring.

For pictures 2½ by 2 . . . each	1	9	
„ 3¼ by 2¾ . . . „	2	6	
„ 4¼ by 3¼ . . . „	3	3	
„ 5 by 4 . . . „	3	9	

Outer Frames for Passe Partouts.

For Passe Partouts of Sizes given.

No. 1.
Imitation rosewood, or Renaissance pattern.

		£	s.	d.
2½ by 2 .	per doz.	0	3	6
3¼ by 2¾ .	„	0	3	9
4½ by 3¼ .	„	0	4	0
5 by 4 .	„	0	5	9
6½ by 4¾ .	„	0	7	6
8½ by 6½ .	„	0	11	0
Ditto, extra	„	0	15	0

No. 2.
Gilt Frames.

		£	s.	d.
2½ by 2 .	per doz.	0	7	0
3¼ by 2¾ .	„	0	8	6
4½ by 3¼ .	„	0	10	0
5 by 4 .	„	0	12	0
6½ by 4¾ .	„	0	13	0
8½ by 6½ .	„	0	15	0

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No. 3.

Rustic oak, very ornamental, square shape.

		£	s.	d.
2½ by 2 .	per doz.	0	7	9
3¼ by 2¾ .	,,	0	8	6
4¼ by 3¼ .	,,	0	9	0
5 by 4 .	,,	0	13	6
6½ by 4¾ .	,,	0	16	6
8½ by 6½ .	,,	1	2	0

No. 4.

Rustic oak, very ornamental, oval or cushion shape.

		£	s.	d.
2½ by 2 .	per doz.	0	12	0
3¼ by 2¾ .	,,	0	12	6
4¼ by 3¼ .	,,	0	13	6
5 by 4 .	,,	0	19	0
6½ by 4¾ .	,,	1	1	0
8½ by 6½ .	,,	1	12	0

No. 5.

Oval black Frames, polished.

		£	s.	d.
2½ by 2 .	per doz.	0	11	6
3¼ by 2¾ .	,,	0	12	6
4 by 3¼ .	,,	0	15	6
5 by 4 .	,,	1	2	6
6½ by 4¾ .	,,	1	10	6
8½ by 6½ .	,,	2	10	0

No. 6.

German stone paste Frames.

		£	s.	d.
2½ by 2 .	per doz.	0	8	0
3¼ by 2¾ .	,,	0	8	6
4¼ by 3¼ .	,,	0	9	0
5 by 4 .	,,	0	12	6
6½ by 4¾ .	,,	0	14	6
8½ by 6½ .	,,	0	16	6

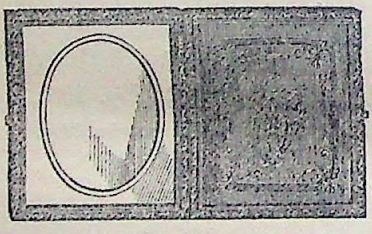

Fig. 106.

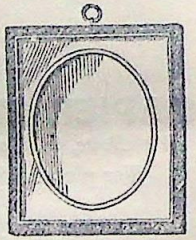

Fig. 107.

MOROCCO CASES, TRAYS, &c.

No. 1.

Common cotton velvet cases, with embossed leather top, with mats, glasses, and preservers.

		£	s.	d.
2½ by 2 .	per doz.	0	2	6
3¼ by 2¾ .	,,	0	4	6
4¼ by 3¼ .	,,	0	7	6
5 by 4 .	,,	0	15	0
6½ by 4¾ .	,,	1	4	0

No. 2.

Common cotton velvet cases, with embossed leather top, gilt rim to edges, with mats, glasses, and preservers.

		£	s.	d.
2½ by 2 .	per doz.	0	3	0
3¼ by 2¾ .	,,	0	5	0
4¼ by 3¼ .	,,	0	8	3
5 by 4 .	,,	0	16	6
6½ by 4¾ .	,,	1	7	0

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No. 3.

Morocco leather cases, embossed silk velvet inside, gilt line on inside edges, mats, glasses, and preservers, very good quality.

		£	s.	d.
2½ by 2 .	per doz.	0	6	6
3¼ by 2¾ .	„	0	9	0
4¼ by 3¼ .	„	0	15	0
5 by 4 .	„	1	7	0
6½ by 4¾ .	„	2	2	0
8½ by 6½ .	„	4	10	0

No. 4.

Best English Morocco leather cases, lined with rich silk velvet, gilt line on inner edge, with mats, glasses, and preservers, of best quality.

		£	s.	d.
2½ by 2 .	per doz.	0	8	0
3¼ by 2¾ .	„	0	12	0
4¼ by 3¼ .	„	0	18	0
5 by 4 .	„	1	9	0
6½ by 4¾ .	„	2	10	0
8½ by 6½ .	„	5	10	0

No. 5.

Lace band cases, of very superior finish, with best mats, glasses, and preservers.

		£	s.	d.
2½ by 2 .	per doz.	0	17	6
3¼ by 2¾ .	„	1	5	0
4¼ by 3¼ .	„	1	13	0
5 by 4 .	„	2	17	6
6½ by 4¾ .	„	3	17	6

No. 6.

Double morocco cases, for holding two pictures, of best quality, gilt rims, mats, glasses, and preservers.

		£	s.	d.
2½ by 2 .	per doz.	0	9	0
3¼ by 2¾ .	„	0	13	0
4¼ by 3¼ .	„	1	0	0
5 by 4 .	„	1	16	0

No. 7.

Carte de Visite cases, with silk velvet lining, gilt edges inside, fitted with mats, glasses, &c.

	£	s.	d.
Per doz. . . .	0	10	0
With clasp . .	0	14	0
American Union Carte de Visite Case . . .	1	4	0

No. 8.

American Union cases, resembling carved ebony, with snaps and hinges, and best silk velvet linings, without mats or glasses.

		£	s.	d.
2½ by 2 .	per doz.	0	16	0
3¼ by 2¾ .	„	1	0	0
4¼ by 3¼ .	„	1	10	0

Mats and Preservers.

No. 1.

Gilt mats, chased or plain, oval, dome, or cushion.

		£	s.	d.
2½ by 2 .	per gross	0	3	0
3¼ by 2¾ .	„	0	4	6
4¼ by 3¼ .	„	0	7	6

No. 2.

Superior gilt mats, chased and beaded, with burnished edges, oval, dome, or cushion.

		£	s.	d.
2½ by 2 .	per gross	0	10	0
3¼ by 2¾ .	„	0	15	0
4¼ by 3¼ .	„	1	0	0

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No. 3.
Gilt Mats, oval, dome, or cushion, best frosted.

		£	s.	d.
2½ by 2	per gross	0	14	0
3¼ by 2¾	„	1	1	0
4¼ by 3¼	„	1	10	0
5 by 4	„	2	5	0
6½ by 4¾	„	3	3	0
8½ by 6½	„	7	0	0

No. 4.
American stamped Mats (thin), oval, dome, or cushion.

		£	s.	d.
2½ by 2	per doz.	0	0	7
3¼ by 2¾	„	0	0	10
4¼ by 3¼	„	0	1	8

No. 5.
American stamped Mats, stout.

		£	s.	d.
2½ by 2	per doz.	0	2	0
3¼ by 2¾	„	0	3	0
4¼ by 3¼	„	0	5	0
6½ by 4¾	„	0	8	0

No. 6.
American Excelsior Mats.

		£	s.	d.
2½ by 2	per doz.	0	3	0
3¼ by 2¾	„	0	5	0
4¼ by 3¼	„	0	8	0
6½ by 4¾	„	0	14	0

Preservers.

Good English.

	per gross. £	s.	d.
2½ by 2	0	3	0
3¼ by 2¾	0	4	6
4¼ by 3¼	0	7	0
5 by 4	0	15	0
6½ by 4¾	1	14	0
8½ by 6½	4	10	0

Best English.

	per doz. £	s.	d.
2½ by 2	0	0	4
3¼ by 2¾	0	0	6
4¼ by 3¼	0	0	9
5 by 4	0	2	0
6½ by 4¾	0	4	0

Best American.

	per doz. £	s.	d.
2½ by 2	0	0	8
3¼ by 2¾	0	0	10
4¼ by 3¼	0	1	8
5 by 4	0	2	6
6½ by 4¾	0	3	9

Morocco Frames or Trays (*Fig.* 107).

No. 1.
Morocco Trays, common, with glasses, mats, and preservers.

		£	s.	d.
2½ by 2	per gross	0	8	6
3¼ by 2¾	„	0	12	0
4¼ by 3¼	„	0	16	0

No. 2.
Best Morocco Trays, lined with silk velvet, gilt rim, mats, glasses, and preservers.

		£	s.	d.
2½ by 2	per doz.	0	1	3
3¼ by 2¾	„	0	2	0
4¼ by 3¼	„	0	3	6
5 by 4	„	0	6	0
6½ by 4¾	„	0	10	6

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No. 3.
American Union Trays, without mats or glasses.

		£	s.	d.
2¼ by 2 . .	per doz.	0	7	0
3¼ by 2¾ . .	„	0	8	6
4¼ by 3¼ . .	„	0	12	6

Lockets and Brooches for Photographs, in great variety, from 1s. 6d. each.

ESTIMATES

OF

Complete Sets of Photographic Apparatus,

FOR THE COLLODION PROCESSES ONLY.

No. 1. **Complete Set of Photographic Apparatus,** for taking positive portraits and views up to 4¼ by 3¼ inches, in wood case, complete, with tripod stand . . . . . £ 3 0 0

This apparatus is of the most simple kind, and consists of a compound achromatic lens (tested); walnut camera and back; 2 plate holders, and focussing screen; mahogany tripod stand; scales and weights; porcelain pan; gutta percha bath and dipper; filtering paper; glass funnel; graduated measure; 1 dozen plates in box; and bottles containing 6 oz. of nitrate of silver bath, 3 oz. positive collodion, 1 pint of developing solution, 1 oz. cyanide potassium, 1 oz. of Bland and Co.'s transparent varnish, with full directions for use.

No. 2. **Complete Set of Photographic Apparatus,** for taking portraits up to 6½ by 4¾, the contents of box being the same as No. 1, only in larger quantities. . . . . £ 5 5 0

No. 3. **Complete Set of Photographic Apparatus,** for taking portraits and views 4¼ by 3¼ inches; consisting of a sliding body camera, in walnut wood:—1 single back, for plates 4¼ by 3¼ inches, fitted with compound achromatic lens of superior construction; reversing frame; glass plates in

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		£	s.	d.
	box; gutta percha bath and dipper; porcelain pan; levelling stand; scales and weights; glass graduated measure; filtering paper and funnel; positive paper, for printing; camera tripod stand; and chemicals, consisting of 1 oz. nitrate of silver, ½ drachm pyrogallic acid, 1 oz. glacial acetic acid, 4 oz. iodized collodion, hyposulphite of soda, 1 oz. varnish; the whole packed in case, with lock and handle	5	0	0
No. 4.	**Complete Set of Photographic Apparatus,** for portraits 4¼ by 3¼ inches, same as No. 3, but with best French-polished mahogany camera, and compound achromatic lens, of Bland & Co.'s own make, in which the chemical and optical foci are warranted to coincide; chemicals, stand, &c., complete . . . . . ,	6	12	6
No. 5.	**Complete Set of Photographic Apparatus,** consisting of sliding body camera of superior construction, with dark slide and loose frames for plates 5 by 4 inches, and 4 by 3 inches; compound achromatic lens, with Waterhouse's Diaphragms, of Bland and Co.'s own make, the chemical and optical foci being perfectly coincident; glass plates, plate boxes; gutta percha bath and dipper; washing pan; levelling stand; reversing frame; glass measures; scales and weights, with glass pans; with all the necessary chemicals, papers, tripod stand, &c., packed in case, complete, with lock and key . . .	9	7	6
No. 6.	**Complete Set of Photographic Apparatus,** consisting of sliding body camera, best make; dark slide with three loose frames for plates 6 by 5 inches, 5 by 4 inches, and 4 by 3 inches, fitted with compound achromatic lens, with Waterhouse's Diaphragms, of Bland and Co.'s own make, the chemical and optical foci being absolutely coincident; glass plates; 3 plate boxes; gutta percha bath and dipper; 2 washing pans; levelling stand; reversing frame; glass measures; scales and weights; funnel; filter ring; supply of positive paper; bibulous paper; tripod stand, with brass top; with all requisite chemicals, in stoppered bottles, and materials; the whole packed in case, with lock and key .	13	10	0

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£ s. d.

No. 7. **Complete Set of Apparatus for Collodion pictures,** 8½ by 6½ inches, 6 by 5 inches, and 5 by 4 inches; comprising mahogany sliding body camera, of best construction, with one dark slide, and three loose frames for glass plates, ground focussing glass, &c., fitted with double combination achromatic lens of Bland and Co.'s own manufacture, in which the chemical and optical foci are perfectly coincident, with Waterhouse's Diaphragms, with rack and pinion adjustment; 1 dozen plates, 8½ by 6½ inches in box; 1 dozen plates, 6 by 5 inches, in box; 1 dozen plates, 5 by 4 inches, in box; gutta percha bath and dipper; 2 washing pans; levelling stand; reversing frame; glass measures; scales and weights; with a full supply of all the necessary chemicals, tripod stand, &c. complete, packed in stout case, with lock and key 27 0 0

Stereoscopic Sets estimated for, according to the kind of Camera selected.

ESTIMATES

OF

Complete Sets of Photographic Apparatus,

FOR THE PAPER PROCESSES ONLY.

£ s. d.

No. 1. **Complete Set of Photographic Apparatus,** for taking pictures by the calotype or waxed-paper process, 6 by 5 inches; consisting of mahogany camera, fitted with single achromatic lens, 1¼ inches diameter, mounted in brass front; single dark slide for prepared paper; porcelain dish; preparing board; glass rod; reversing frame; 1 quire of photographic paper; 1 quire of bibulous ditto; set of scales and weights; 1 oz. measure; minim ditto; tripod stand; and all the necessary chemicals, &c., in stoppered bottles; the whole packed in case with lock and key 5 5 0

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		£	s.	d.
No. 2.	**Complete Set of Photographic Apparatus,** for taking pictures by the calotype or waxed-paper process, 7 by 6 inches, consisting of mahogany camera, fitted with single achromatic view lens, 2¼ inches diameter, mounted in brass front; single dark slide for prepared paper; ground focussing glass; 2 porcelain dishes; board for the preparation of paper; 2 glass rods; reversing or printing frame; tripod stand for supporting the camera; 2 quires of photographic paper; 2 quires of bibulous ditto; scales and weights; glass measures; funnel; with all the necessary chemicals, &c.; the whole packed in case, with lock and key	6	6	0
No. 3.	**Complete Set of Photographic Apparatus,** for taking pictures 9 by 7 inches, by either the calotype or waxed-paper process, comprising mahogany camera, fitted with single achromatic view lens, 2⅝ inches diameter, mounted in brass front; 1 double back for prepared paper, ground focussing screen; tripod stand for supporting camera; 2 porcelain dishes; preparing board; 2 glass rods; reversing or printing frame, for obtaining positives; 2 quires of photographic paper; 2 quires of bibulous ditto; scales and weights; glass measures and funnels; with all the necessary chemicals, complete; the whole packed in case, with lock and key . . .	9	9	0
No. 4.	**Portable Photographic Apparatus,** consisting of a folding camera of best construction, with ground focussing glass; 1 double back for prepared paper; fitted with single achromatic lens, 2¼ inches diameter, mounted in brass front, sliding adjustment for foreground and sky, adapted for taking pictures by the calotype or waxed-paper process, 7 by 6 inches; tripod stand for supporting the camera; 2 porcelain washing pans; preparing board; 2 glass rods; reversing frame; glass graduated measures and funnels; 2 quires of photographic paper; 1 quire of albumenized ditto; 1 quire of bibulous ditto; scales and weights, with glass pans; and a full supply of chemicals; the camera and lens packed in leather sling case, for convenience of carriage; the chemicals and other apparatus in case, with lock and key	12	0	0

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		£	s.	d.
No. 5.	**Portable Photographic Apparatus,** comprising folding camera of best construction; ground focussing glass; 1 double back for prepared paper, 9 by 7 inches; fitted with single achromatic view lens, 2⅝ inches diameter, mounted in brass front, with adjustment for foreground and sky; tripod stand, for supporting the camera; preparing board; 2 glass rods; 1 ounce glass graduated measure; minim ditto; 2 glass funnels; 2 porcelain pans for washing paper; reversing or printing frame; set of scales and weights, with glass pans; 3 quires of photographic paper; 2 quires of albumenized ditto; 2 quires of bibulous ditto, with a full supply of chemicals, &c. The camera, with back and lens, packed in leather sling case, for convenience of carriage; the chemicals and other apparatus in strong case, with lock and key . . .	15	0	0
No. 6.	**Portable Photographic Apparatus,** consisting of folding camera of best construction; ground focussing glass; 1 double back for prepared paper, 11 by 9 inches fitted with single achromatic view lens, 3 inches diameter, mounted in brass front with rack-work adjustment; sliding front to camera, for adjusting proportion of foreground and sky; tripod stand for supporting the camera; 2 porcelain pans for washing paper; preparing board; 2 glass rods; glass graduated measures; glass funnels; reversing or printing frame; set of scales and weights, with glass pans; 3 quires of photographic paper; 3 quires of albumenized ditto; 3 quires of bibulous ditto; with a full supply of chemicals for the calotype or waxed-paper process; the camera and lens packed in leather sling case, for convenience of carriage; the chemicals and other apparatus in strong case, with lock and key . . .	20	0	0

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ESTIMATES

FOR

Complete Sets of Photographic Apparatus,

FOR COLLODION PORTRAITS AND VIEWS BY PAPER PROCESSES, OR FOR COLLODION PORTRAITS AND VIEWS.

		£	s.	d.
No. 1.	**Complete Set of Photographic Apparatus,** for taking portraits by the collodion process, 4¼ by 3¼ inches, and views or landscapes 6 to 5 inches, on either collodion, calotype, or waxed paper; comprisisg a sliding body French-polished mahogany camera, with 1 single back for paper or glass, and 1 single back, with loose frames, for collodion plates; fitted with compound achromatic lens of Bland and Co.'s own make, which is adapted for either portraits or views; tripod stand; scales and weights; levelling stand; gutta percha bath and dipper; 1 dozen glass plates in box, 4¼ by 3¼ inches; 1 dozen ditto in box, 3¼ by 2¾ inches; reversing or printing frame; 2 glass graduated measures; 2 funnels; glass rods; preparing board; 2 porcelain washing pans; 1 quire of photographic paper; 1 quire of albumenized ditto; 1 quire of bibulous ditto; and a supply of chemicals, both for collodion and calotype or waxed paper process; the whole packed in case, with lock and key	10	0	0
No. 2.	**Complete Set of Photographic Apparatus,** for taking portraits on collodion 5 by 4 inches, and views or landscapes 7 by 6 inches, on either collodion, calotype, or waxed paper; consisting of mahogany French-polished sliding body camera, with 1 single back for paper or glass, 7 by 6 inches, and 1 single back for collodion plates; 2 loose frames 5 by 4 inches, and 4 by 3 inches; fitted with compound achromatic lens,			

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		£	s.	d.
	of Bland and Co.'s own make, which is adapted for either portraits or views; tripod stand; scales and weights; levelling stand; gutta-percha bath and dipper; 1 dozen glass plates in box, 5 by 4 inches; 1 dozen ditto in box. 4 by 3 inches; reversing frame; 2 glass graduated measures; preparing board; 2 pans for washing; 1 quire of photographic paper; 1 quire of albumenized ditto; 1 quire of bibulous ditto; 2 glass funnels; and a good supply of chemicals in stoppered bottles, consisting of nitrate of silver, iodide of potassium, gallic acid, acetic acid, varnish, hyposulphite of soda, iodized collodion, pyrogallic acid, chloride of sodium, cyanide of potassium, nitrate of silver bath, &c.; the whole packed in case complete, with lock and key	13	10	0
No. 3.	Ditto, ditto, same as above, but with portable folding camera, of best construction, with one double back for paper, and one single back for collodion plates	14	10	0
No. 4.	**Complete Set of Photographic Apparatus,** for taking portraits on collodion 6 by 5 inches, and views or landscapes 6 by 7 inches, on collodion, calotype, or waxed paper; comprising a mahogany French-polished sliding body camera, with one single back for paper or glass, 9 by 7 inches, and one single back, with two loose frames, for collodion plates, 6 by 5 inches, and 5 by 4 inches, fitted with compound achromatic lens of Bland and Co.'s own make, which is adapted for both portraits and views; tripod stand; scales and weights; levelling stand; gutta-percha bath and dipper; 1 dozen glass plates, 6 by 5 inches, in box; 1 dozen ditto, 5 by 4 inches, in box; reversing frame; 2 glass graduated measures; preparing board; glass rods; 2 porcelain washing pans; 2 quires of photographic paper; 2 quires of albumenized ditto; 2 quires of bibulous ditto; 2 glass funnels; and a good supply of chemicals required in both processes; the whole carefully packed in case, with lock and key . . .	17	17	0

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		£	s.	d.
No. 5.	**Complete Set of Photographic Apparatus** (No. 4), with portable, folding camera, of best construction, with one double back for paper, and one single back for collodion plates . .	18	10	0
No. 6.	**Complete Set of Photographic Apparatus,** for taking portraits on collodion plates 8½ by 6½ inches, and views or landscapes 11 by 9 inches, on either collodion, calotype, or waxed papers; comprising mahogany sliding body camera, French-polished, with one single back for glass or paper, 11 by 9 inches, and one single back for glass plates, with two loose frames 8½ by 6½ inches, and 6 by 5 inches; fitted with compound achromatic lens, of Bland and Co.'s own make, which is adapted for either portraits or views; tripod stand; scales and weights; levelling stand, gutta percha bath and dipper; 1 dozen plates in box, 8½ by 6½ inches; 1 dozen ditto, 6 by 5 inches, in box; reversing frame; 2 glass graduated measures; preparing board; 2 glass rods; 2 pans for washing; 3 quires of photographic paper; 3 quires of albumenized ditto; 3 quires of bibulous ditto; 2 funnels; and an ample supply of all the requisite chemicals for both processes, in stoppered bottles; the whole packed in strong case, with lock and key . .	30	0	0
No. 7.	Ditto, ditto, same as above, but with portable folding camera of best construction, with one double back for paper, and one single back for collodion plates	31	15	0

Estimates given for Complete Sets, *for any single Process, or combination of Processes, not enumerated in the above List.*

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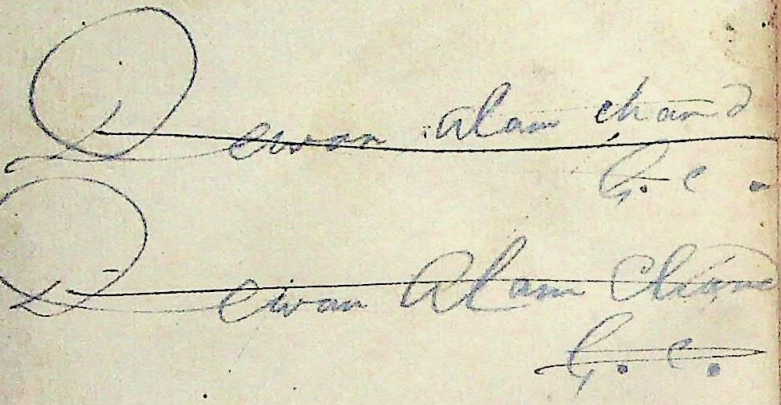

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